

JPRS 74081

27 August 1979

Worldwide Report

ENVIRONMENTAL QUALITY

No. 222



FOREIGN BROADCAST INFORMATION SERVICE

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REPORT DOCUMENTATION PAGE	1. REPORT NO. JPRS 74081	2.	3. Recipient's Accession No.
4. Title and Subtitle WORLDWIDE REPORT: ENVIRONMENTAL QUALITY, No. 222		5. Report Date 27 August 1979	
7. Author(s)		6.	
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201		8. Performing Organization Rept. No. 10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)	
12. Sponsoring Organization Name and Address As above		13. Type of Report & Period Covered 14.	
15. Supplementary Notes			
16. Abstract (Limit 200 words) This serial report contains worldwide press and radio coverage of environmental pollution and its effects; and pollution control technology, organizations, and programs.			
17. Document Analysis a. Descriptors Worldwide Pollution Environmental Control Meteorology Ecology b. Identifiers/Open Ended Terms c. COSATI Field/Group 4, 6, 18G, 18H			
18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22161		19. Security Class (This Report) UNCLASSIFIED 20. Security Class (This Page) UNCLASSIFIED	21. No. of Pages 62 22. Price

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TOUGHER ANTIPOLLUTION LAWS RECOMMENDED FOR VICTORIA

EPA Drafts Policy

Melbourne THE AGE in English 22 Jun 79 p 5

[By Peter Roberts]

[Text]

The Environment Protection Authority has recommended tougher air pollution laws for metropolitan Melbourne, Geelong, and the La Trobe Valley.

The EPA yesterday released a draft air quality policy which sets out, for the first time, air pollution objectives for the State.

The EPA's principal air quality officer, Dr J B. Robinson, said the authority was concerned about high levels of ozone and nitrogen-oxide pollution in metropolitan Melbourne and Geelong.

He said there was a potential problem in the La Trobe Valley because of plans for the increased use of brown coal.

More stringent controls are proposed for these regions.

The draft policy sets acceptable, detrimental and alert levels for the major pollutants.

It recommends an air pollution alert system to warn the public when pollution is a threat to health.

The system, which Mr Robinson hopes will never be needed, could involve powers to shut down industry and restrict the use of private cars.

Dr Robinson said the alert level for ozone had already been passed once in February, 1976, when concentrations of the gas reached 25 parts per million near the Maribyrnong River.

The draft policy, which is open for public comment for four months, cost \$170,000 to prepare. Before the policy was drawn up EPA air pollution licences were issued with no overall goal in mind.

The policy divided pollutants into three categories. Pollution controls for the most toxic or dangerous substances, including asbestos, vinyl chloride and mercury, will be required "to the maximum extent achievable by technology". The policy reorganises the EPA licence system, dropping licences altogether for small pollution sources in favor of general control regulations.

It sets out maximum permissible omissions from new industries.

Dr Robinson said tougher standards would be set if individual pollutants exceeded the air quality objectives.

"Once you reach the objectives, any new industry would come in only on the basis of being able to reduce emissions from existing industries," he said.

"That situation is still some distance off in most cases."

The policy recommends tighter vehicle exhaust emission controls and restriction on backyard incinerators when pollution is high.

Dr Robinson said pollution cost the community money in poor health, lower crop and plant growth rates and reduced life of materials such as paint and rubber.

"We always hear about the cost to industry of pollution controls, but we don't hear of the cost to the community," Dr Robinson said.

"Reasonable control of our air quality is a lot less expensive than allowing the air to deteriorate to the situation where you have to spend enormous amounts to clean it up."

Emission Controls Discussed

Melbourne THE AGE in English 22 Jun 79 p 9

[Article by Peter Roberts: "Exhaust Controls -- Tighter Still?"]

[Text]

THE Environment Protection Authority is quick to accept that there is public disenchantment with Australia's motor vehicle pollution controls.

But it is equally quick to point out that manufacturers will have to go further still if the big cities are to preserve even their present doubtful air quality.

With State and Federal transport ministers fighting over plans for tougher controls, the EPA has set the stage for debate on even tougher controls. The options are set out in its draft air policy for Melbourne, released yesterday.

Dr J B Robinson, the EPA's principal air quality officer, said that nobody has the right to treat the air as his or her garbage dump.

The ability of the air to cope with what factories, homes and motor vehicles spew out has to be considered, and there comes a time when enough is enough.

Dr Robinson said: "The present controls are just holding the status quo. As the car population increases, then the situation will become worse. In order to keep pollution under control we will need to tighten emission controls."

Dr Robinson said federal officials were talking about tighter controls from 1985, and a decision had to be made soon to give the motor vehicle industry enough lead time to design equipment.

Documents released with the EPA's draft policy estimate that motor vehicles contribute 50 per cent of hydrocarbon pollution, 84 per cent of carbon monoxide and 78 per cent of nitrogen oxides in the Melbourne air.

Ozone is the visible result of this mixture and a process likened to cooking in a gigantic pot — with sunlight and still weather the other essential ingredients. Conditions must be just right and fortunately this does not happen often in Melbourne's changeable climate.

Emissions from uncontrolled petrol vehicles range from evaporation from the fuel tank and carburettor, carbon monoxide, nitrogen oxides and hydrocarbons from the exhaust, to the fuel-air mixture which is forced past the piston rings and escapes through the crankcase vent.

The motor vehicle controls began in 1970 when crankcase emissions were banned. Carbon monoxide was limited in 1972, hydrocarbons in 1974 and nitrogen oxides on July 1, 1976.

The 1976 control, Australian Design Rule 27a, caused a stir. According to the EPA, manufacturers had three ways of meeting standards — only two of which gave improved efficiency and fuel economy. Most manufacturers chose cheaper add-on techniques with detrimental results. Petrol consumption was up and performance down.

Dr Robinson said the first step should be to ensure that present pollution controls were working. Only pre-production vehicles are tested to give a model certification under ADR 27a.

It is estimated that 20 per cent of new cars do not comply with pollution controls, and the proportion rapidly increases once the engines are tuned to other than manufacturer's specifications. The failures are mainly caused by improper adjustment.

"If a person pays \$60 to \$80 for pollution controls, the controls should work," Dr Robinson said. "If your car is out of tune then chances are it is not meeting the limits."

"Non-compliance of new cars could be overcome by testing a representative sample, say 2 per cent, prior to sale and preventing registration of models which consistently fail the standard."

Alternatively, the EPA is suggesting that vehicles meet the pollution standards over the full range of carburettor and timing adjustments. EPA policy also is for tighter controls of evaporative losses, a measure that will actually save fuel.

The other aspect of air pollution is that of lead emission. The Victorian Government is requiring reduced amounts of lead in petrol — there is now 0.45 grammes in every litre. The aim is to keep the total amount released at static while health questions are resolved.

Dr Robinson said the EPA was aiming at a long term goal of no more than 1.5 microgrammes of lead in Melbourne air, averaged over a 30 day period. Lead concentrations in city streets on an hourly basis have risen as high as 26.7 microgrammes.

If Australia adopts the US approach for tighter controls, then new cars would require unleaded petrol sold alongside leaded petrol for conventional cars. US cars use an expensive catalyst inside a redesigned muffler system. The catalyst, which is destroyed by lead, would cost up to \$300 but converts most pollutants to harmless gases.

Moving to unleaded petrol would involve higher energy

consumption in refining and, possibly, slightly lower engine efficiency. On the other hand, a catalyst system would overcome the ADR 27a problems.

"We want to push technology ahead so people can benefit from better driveability and fuel economy," Dr Robinson said.

"The manufacturers would not have to do any engine design work to get back to the engine performance they had before. Essentially you are talking about a chemical treatment of the exhaust gases rather than an engineering treatment of the engine."

Dr Robinson said it would be easier for manufacturers to introduce a two model system -- one for the city and one for the country -- as the catalyst system was not designed into the engine.

"We have no desire to control vehicles in the country. But no one has yet come up with a practical way to differentiate between city and country. The chances are better with catalysts," he said.

EXPERTS EXAMINE VICTORIA'S SALINITY PROBLEMS

Problems in Irrigated Areas

Melbourne THE AGE in English 11 Jun 79 p 9

[Article by Stephen Downes: "War on the White Plague"]

[Text]

ABSOLUTELY nothing grows on almost a quarter of Linton Mills' 320-hectare irrigation farm near Kerang. Not a blade of grass nor a wisp of saltbush.

Standing in the middle of his worst paddock, you are surrounded by chocolate earth stretching for hundreds of metres. It is as smooth and as flat as a billiard table.

When it rains, the top few centimetres of the soil turn into a salty slush. But, paradoxically, the water does not penetrate, and less than half a metre below ground the earth can be relatively dry.

This is Victoria's salinity problem at its worst. Almost all the 1,000,000 hectares of the Kerang irrigation, in the north-west of the State bordering the Murray River, is affected to some degree by salt.

Thousands of hectares are bare ground, but for sporadic clumps of low red and grey saltbush scrub. A white dusting of salt can sometimes be seen on the worst land.

"It nearly ruined us," says Linton Mills.

But, like many modern farmers, Mr. Mills is rebounding. Using refined agricultural techniques he is turning his patch of the Kerang region into one of the lush plots in the Garden State.

Thousands of years ago, much of the land now being irrigated was under the sea. So the bed-

rock around Kerang is naturally salty. The area is also a drainage basin for underground streams that in some cases have their origins in the foothills of the Great Dividing Range.

The underground watercourses — aquifers — percolate through salty rock and for geological reasons dam up under Kerang. The water level below ground is unusually high and in wet years can break through the surface.

But to aggravate these problems, our forefathers added their own devilment — they made the disastrous decision to irrigate in Kerang.

A complex of channels was dug, but foolishly a drainage system to take away used water was neglected.

Many experts say the region should never have been irrigated. But it was — unscientifically and in ignorance of the chaos it would cause. National-Country Parties, anxious to enhance the rural vote, pushed the irrigation barrow hard and a great infrastructure of dams along the Murray and channels that went as far south as Shepparton was developed.

Irrigation farmers were allowed a water "right" — cheap water — and today they pay only \$3.95 for every million litres that floods their paddocks.

Despite the obvious subsidies taxpayers bestow on irrigators, to shift the 15,000 or so people of the region would require a fortune and involve enormous social costs.

It would be a particularly inappropriate decision, seeing that Kerang is more buoyant on the current agricultural wave than several other areas of the State with fewer natural problems.

The best farms in the region are highly competitive, cropping almost twice as much as dryland areas.

Mr. Gyn Jones, the Agriculture Department's irrigation officer at Kerang, says farmers who ignore salinity are dying out or going broke.

The best farmers are using laser beams to slope their paddocks (the gradient is between 1/1000 and 1/800) with precision. They need less water, so less runs off as wasteful drainage at the far end of the field.

Laser grading began in earnest only last Christmas. About 20 units are operating in the region and Gyn Jones hopes they will make a big contribution to solving salinity.

A laser emitter is set up at one end of a paddock. A receiver for the beam is fixed to the top of the grader blade. Because a laser beam is so straight and narrow, the farmer driving his grader can iron out humps and dips in his field that even he cannot see.

The best farmers are also re-using drainage water. They are sacrificing the worst areas of their farms as evaporation basins for water that they pump from underground, thus lowering the always threatening ground-water "table".

They are being encouraged "at last", says Mr. Jones — to plant trees. If each farmer put in salt-tolerant trees on 12 per cent of his land there would be a significant reduction in the water table. A river red gum (*Eucalyptus rostrata*) can take 800 litres a day from the ground and put it into the atmosphere.

The State Government recently promised \$15 million over the next 10 years to fight salinity in northern Victoria. Of that total, \$4 million is to go to the Kerang region in the next seven years as loans (with generous terms) mainly for financing farm draining and regrading.

Although an irrigator, Linton Mills holds no brief for his more careless colleagues. "There is probably too much Government subsidising," he says. "If water were more expensive, a lot of the area's problems could be solved more quickly."

The worst farmers have gone broke already, he says. But there are still many who have hollows in their paddocks, who don't bother to cut water off after the ground is wet, and who "tip the stuff out as if it is worthless".

Mr. Mills, 45, is stocky, thoughtful, with a big grasp of the land beneath his feet.

He can use up to 670 million litres in each nine-month (August to May) irrigation season. In the season just finished, he watered 52 hectares of millet, 24 hectares of sunflowers, 24 hectares of summer pasture and 32 hectares of permanent pasture. He runs about 600 ewes for fat lambs and wool.

He stripped 127 tonnes of millet from 46 hectares this season from his best paddock. From the worst 12 hectares of his cultivable land, he could manage only 19 tonnes; half the productivity.

Later, in the cream weather-board farm house, over cheese sandwiches and tea, his wife, Valerie, shows you color photos of the crops: their younger daughter holds sunflowers the size of beach-balls; the elder girl — 21 — has her arms stretched to the sky in the millet; you can see them only from the elbows up.

Linton Mills' before-tax income fluctuates "violently", from about \$30,000 in a good year to \$8000 in a bad. But he quickly adds that the sole reason for the swing is market prices.

"I tend to think salting will be solved by the farmers themselves," he says.

But he would like to see more co-ordination of the Government's attempts to combat the problem.

"If you've got lousy sheep, someone from the Agriculture Department can remind that you dip them. But if you have swamps all over your property, nobody can tell you to drain them . . . it's just not the law".

Irrigators at Kerang have immediate reasons for wanting to reduce salinity. But the whole Australian community has the best one: if salting is not controlled, the Murray will be nothing more than a vast attractive drain by the year 2000.

More than 1.35 million tonnes of salt enters the river along its length each year. About 40 per cent of it comes from irrigation drainages.

The Federal Government has set aside \$200 million for a five-year programme to improve water quality and the South Australian Engineering and Water Supply Department announced in February a \$23 million plan to save the river.

The money for the Kerang proposals comes from \$40 million earmarked by the Victorian Government four years ago to reduce salinity in both the Murray and the irrigation districts.

Major engineering proposals being investigated include evaporating groundwater near Kerang or piping it overland to the sea.

But, so far, initiatives to save Australia's biggest river system have been piecemeal and uncoordinated.

It is surely worth an unremitting attack by Governments, lobby groups and ordinary Australians.

Troubles in Dry-Farming Areas

Melbourne THE AGE in English 19 Jun 79 p 11

[Article by Peter Roberts: "How the Salt Is Killing the Land"]

[Text]

DR. JEFF JENKIN, of the Soil Conservation Authority, spreads an aerial photograph on the boot of his car. We are here, he says, pointing to an area at Kamarooka, 30 kilometres north of Bendigo.

He runs his finger around an area of 900 hectares of what was once prime wheat country. From the air the paddocks appear bleached; the symptom of an ugly ill gripping our dry-farming areas.

The 900 hectares, Dr. Jenkin says, is absolutely useless, killed by salty underground water still rising inexorably in the district.

Another 10,000 hectares in the immediate area is incipiently salted and could go the same way.

Dr. Jenkin says: "It won't take much of a rise in the water table for that area to be affected. This is not exaggerating, it is bad news."

Back in Melbourne the SCA's principal researcher, Mr. Frank Gibbons, had described the problem as very serious, but had warned against "crying wolf" over dryland salinity. He said more needed to be found out about the rate of increase in salt-affected areas.

But at Kamarooka the story is one of heartbreak for farmers who are seeing their best crop areas falling victim to rising salt.

The three worst affected farms at Kamarooka have between 50 and 60 per cent of their area destroyed. One family has been forced off the land.

Over the past 20 years intensive cropping has given way to grazing, and finally an expanse of stony, bare earth with scattered clumps of sea barley grass. As far as the eye can see the skeletons of trees dot the landscape.

Tree branches lie where they have fallen in heaps along the roadside. No one has bothered to move them.

More than 85,000 hectares of grazing and cropping country valued at \$23 million has been degraded by salt in Victoria's

dry-farming areas since settlement.

That is 1 per cent of the State's cleared land, and salt areas are growing by up to 15 per cent a year.

The worst affected areas are the northern slopes of the Great Dividing Range, along the base of sand ridges in the Mallee, and on the edge of the Dundas Tablelands.

Another 64,000 hectares of topsoil has been blown away by winds, leaving salt scalds — exposed saline clays.

Irrigation salting — discussed in these pages last week — and dryland salting have the same cause: rising water tables.

In dry-farming areas indiscriminate clearing of deep-rooted native trees and vegetation has changed the ability of the land to rid itself of the water that falls as rain.

In uncleared areas vegetation draws the moisture to the surface and evaporates it through leaves in a process known as evapotranspiration. The soil is actually dampest near the surface because of the drawing power of roots.

In cleared areas, the shallow-rooted crops and pasture grasses transpire only a fraction of the water. Soil wetness actually increases until it reaches the naturally saline underground water table.

The water table closely follows the natural contours, rising under hills and dipping down in valleys. Over the past 100 years several metres of extra water has percolated through to the groundwater.

The water table has risen up through the soil, dissolving salt trapped in weathered rock and stored in the soil itself. In the past few years it has increasingly reached the surface in saline seeps.

The villain at Kamarooka is a low treeless ridge, perhaps 20 metres high, which acts as a barrier against the movement of underground water. Nearby, the water is about a metre from the surface.

The first signs appear when saline groundwater reaches the surface zone where it can move by capillarity to the roots of trees. They sicken and eventually die. A farmer may continue ploughing the affected area for years before he abandons cropping because of diminishing yields.

Next, pasture grasses such as clovers and rye grass die off, leaving bare patches and the occasional salt-tolerant species such as sea barley grass — which is almost useless for grazing.

About 30 kilometres east of Kamarooka in the gently rolling Colbinabbin Range almost every valley and depression is affected by salt. It often breaks out under a dam and in many places is advancing up slopes, killing trees and denuding pastures.

Five per cent of this area — usually the most productive creek flats — is dead. Upslope the bare hills are now the most favored areas for cropping.

If the SCA has been successful in making the public and politicians aware of erosion, it has been an uphill fight to focus attention on dryland salinity.

It was not until August last year that representatives from all the relevant State Government departments toured affected areas together. A State-wide co-ordinating committee was the result.

Dr. Jenkin has done the tour before. The grand finale is a farmer's dam and creek, now little more than a moonscape. What is virtually a saline drain winds through bare paddocks among skeletons of trees.

These gullies and streams can be as salty as the Dead Sea. Farm dams in the area contain up to 20,000 parts per million (ppm) of salt; the desirable standard for human consumption is 500 ppm.

Dr. Jenkin said that in summer pools in the Avoca River, which flows into the Murray, salinity could reach 130,000 ppm.

"I've seen pools that were so salty that salt crystals were forming on the bottom. In summer, salinities as salty as sea-

water are fairly common in some of the streams that we regard as main streams."

He is concerned that saline water will contaminate domestic water supplies. Ultimately Adelaide, which takes more than half of its water directly from the Murray, could be threatened.

No State is free from dryland salting. The West Australian Government has been forced to impose strict controls on clearing in the catchment of the Wellington Dam because of an alarming rise in salinity. Four out of 10 streams in the State's south-west are said to be too brackish to drink.

Irrigation salting and the economic power of the stone fruit industry have led to massive engineering works to pump out saline groundwater to evaporation basins. But there is no engineering answer to dryland salting where soils are hard to drain and underground water difficult to pump.

The SCA has developed a strategy that may offer hope for reversing the salting trend. So far, it is restricted to Band-aid measures — planting of wheat grass and other salt-tolerant plants in salted areas. The SCA also presses for less bare fallowing, which encourages water penetration.

Individual farmers must bear the cost of the rehabilitation works. The reward is occasional limited grazing on the previously useless land.

A research project at Maryborough, funded by the Reserve Bank, is working on a long-term solution. This involves remodelling whole stream catchments to resemble the water systems existing before clearing.

The theory is to plant trees in strips on higher ground where it is believed excess water is infiltrating the water table. It is hoped that the trees, perhaps as much as 10 per cent of a farm, will suck water from underground before it has a chance to swell underground supplies down the slope. Results of the Maryborough plantings will not be known for five years.

The Salting Action Liaison Team (SALT) has been formed by church and community groups in Maryborough to promote public

awareness of the problem. Mr. Terry White, of the Christian Community College, says salt is spreading with disturbing rapidity.

SALT hopes to promote the planting of cash crops such as carob, olives and jojoba beans on the salt-affected areas. It wants strategic plantings on hillsides to mop up the water.

Mr. White says that over-clearing on the northern slopes threatens the Murray irrigation districts. Excess water is penetrating the deep mining leads and rising under pressure under the irrigation fields, he says.

"When that water reaches the already high ground water at the surface, it will be a complete wipeout for the Murray Valley."



An example of erosion after salination of farmland in northern Victoria. (Soil Conservation Authority picture.)

AUSTRALIA

CONTROVERSY OVER GREAT BARRIER REEF EXPLORATION CONTINUES

Permits to Foreign Companies

Melbourne THE AGE in English 27 Jun 79 p 3

[From Mark Baker in Brisbane and Stephen Mills in Canberra]

[Text] Two foreign companies have Federal Government approved permits to explore Great Barrier Reef waters despite the announcement of a moratorium on reef surveys.

The Federal Department of National Development and the Minister, Mr. Newman, supported approval for the companies as early as August last year, according to documents shown to 'The Age' yesterday.

The moratorium, announced in Parliament on June 4 by the Prime Minister, Mr. Fraser, banned "further exploration for petroleum in the Great Barrier Reef region".

It is believed Mr. Fraser was not aware then that permits had been issued or that a Federal department was involved.

Mr. Fraser has now urgently queried an oil survey by one of the approved companies.

He wrote to the acting Minister for National Development, Mr. McLeay, on Thursday.

Mr. Fraser told him the survey would intrude on the reef region, contravening the letter and the spirit of the moratorium.

He asked Mr. McLeay to make sure surveying ceased in the reef region.

The survey vessel Eugene McDermott, owned by American-based Geo-physical Services International completed its survey off Townsville last week.

Mr. Newman was away last week and has not yet commented on Mr. Fraser's letter.

Mr. Newman and the Minister for the Environment, Senator Webster, are studying files to see how GSI was granted permission to survey.

The Queensland Premier, Mr. Bjelke-Petersen, said yesterday he was at a loss to understand the order by Mr. Fraser to stop the geophysical survey.

His Minister for Mines, Mr. Camm, angrily accused Mr. Fraser of "speaking with forked tongue".

"The Federal Government has implied that they had no knowledge of this matter, and the records on our files prove that is not the case. This was not granted by Queensland alone, but came after Federal Government approval," he said.

The Department of National Development first backed an extension of GSI's permit into the Barrier Reef area around the Halifax Basin on August 25.

It gave similar support to another company, Western Geophysical, on November 21.

Under the Government approval, the Queensland Government will be given the data free within six months of the survey's conclusion.

GSI has denied its survey intruded on the reef or damaged marine life.

The Eugene McDermott left the Coral Sea at the weekend for Dampier, WA, to do a survey there.

The Opposition spokesman on the environment, Mr. Cohen, described the Government's actions over the survey as a "monstrous deception".

He said that Mr. Fraser, Senator Webster and the Attorney-General, Senator Durack, had either misled Parliament or had been misinformed in their statements on the extent of exploration on the reef.

Petroleum Exploration Banned

Sydney THE SYDNEY MORNING HERALD in English 27 Jun 79 p 12

[Text] Canberra.--The Prime Minister, Mr Fraser, has ordered a ban on all forms of petroleum exploration in waters around the Great Barrier Reef.

The ban follows a report by a Queensland MP last week that a company was conducting seismic surveys off the coast near Townsville.

Mr Fraser wrote to the then acting Minister for National Development, Mr McLeay, ordering the ban.

But, the Queensland Premier, Mr Bjelke-Petersen, said late yesterday that the ban did not matter in this case, at least, since the survey was completed last week.

The research vessel was on its way back to Perth.

The survey was being done by Geophysical Services International, a private company which sells the data it collects to oil companies.

Even though there were no explosions or drilling involved, and the survey was apparently not in the immediate Reef area, Mr Fraser ordered the ban because of his commitment on June 4 that there would be no exploration until research was done on its effects.

An official of the Department of Natural Development told the Herald last week that the survey was based on the Coral Sea Islands, about 400 kilometres off Townsville.

It had been approved by the Federal and Queensland Governments.

Premier 'at a loss'

In Brisbane, yesterday, Mr Bjelke-Petersen said he was at a loss to understand the order by the Prime Minister.

The Commonwealth had approved of the survey, and laid down conditions under which it could be carried out, in a letter from its National Development Department to the State Mines Department on May 4.

In fact, in addition to the Commonwealth having approved the survey, the ship had finished its work and left the region en route to Western Australia some days ago.

Mr Bjelke-Petersen said the survey was to establish the physical properties of the Continental Shelf area and had nothing whatsoever to do with seismic surveys for oil, as claimed.

Its benefits would vary from clearer definition of shipping lanes and underwater obstructions, to fishing.

Queensland Premier's Reaction

Brisbane THE COURIER-MAIL in English 27 Jun 79 p 8

[Text] The Premier (Mr. Bjelke-Petersen) said yesterday he was "at a loss" to understand the order by the Prime Minister (Mr. Fraser) to stop a geophysical survey in Barrier Reef waters.

The Commonwealth had approved the survey — and laid down conditions under which it could be carried out — in a letter from its National Development Department to the State Mines Department on May 4.

The Mines Minister (Mr. Camm) said Queensland originally was approached by the Commonwealth last August for approval for the survey.

Mr. Bjelke-Petersen said the ship had finished its work and left for Western Australia some days ago.

The survey by Geophysical Service International was to establish the physical properties of the continental shelf area and had nothing to do with seismic surveys for oil, as claimed.

No explosives

The survey would provide wide-ranging information, including clearer definition of shipping lanes and underwater obstructions to fishing.

Mr. Bjelke-Petersen said that contrary to allegations by Opposition Minerals and Energy spokesman (Mr. Vaughan) and others, no explosives were used. Compressed air equipment had been used. This caused no damage, or even the possibility of damage.

It had been a strictly scientific investigation of the physical sea floor.

"We will bring it to Mr. Fraser's notice at Thursday's Premiers' meeting

in Canberra — if not before — that the Commonwealth approved the survey," said Mr. Bjelke-Petersen.

He said the survey did not present a problem to the spirit of the recently signed Commonwealth - State agreement on the Great Barrier Reef Marine Park Act.

In Sydney yesterday, a Geophysical Service International spokesman said the seismic survey ship Eugene McDermott had stopped operations last Saturday.

Not on Reef

"We had finished all we set out to do by then," he said.

G.S.I., a subsidiary of the giant United States corporation Texas Instrument, not operated its survey on the Great Barrier Reef, he said.

"We operated totally outside the Barrier Reef Marine Park, which covers all of the Barrier Reef.

"We carried out our survey in the Coral Sea where the average depth is 1500 metres," he said.

AUSTRALIA

GOVERNMENT ADVISED TO POSTPONE EMISSION CONTROLS

Sydney THE SYDNEY MORNING HERALD in English 21 Jun 79 p 8

[From Paul Ellercamp]

[Text]

CANBERRA. — A scientific report to the Federal Government recommends that further vehicle emission controls be delayed until 1982 and 1985.

The report, by the Australian Academy of Technological Sciences, said this was because problems with present controls would render them wasteful and ineffective if intensified, as planned, next January.

The report agrees basically with the Government's stand that stage three of emission controls under Australian Design Rule 27A should be deferred.

But it rebuts one of the major arguments the Government has advanced in support of its stand: that the controls waste too much fuel.

The report says the extra fuel used is negligible compared with other factors affecting fuel consumption.

"We estimate that emission control may intrinsically involve a fuel consumption penalty of about 3 per cent, but we see ample scope for advancing techniques to reduce actual fuel consumption below that of pre-ADR27A cars," the report says.

The Federal Transport Minister, Mr Nixon, has cited the "fuel penalty" and the availability of alternative methods to control petrochemical pollution from cars as reasons why the present emission controls should not be intensified.

But NSW and SA have vowed to go ahead with them and, since these States represent half the vehicles in use in Australia, their decision could be binding on the other States.

The Academy's report, issued yesterday, cited problems hindering the present controls as apathy towards car quality in Australia, poor tuning of vehicles, and tampering with controls after purchase.

"Unless measures are taken to overcome these problems, be an ineffective and wasteful application of stage three would exercise, incurring unproductive costs to the motorist," the report said.

As an alternative, the Academy recommended further controls on evaporative emissions emission standards in 1985.

The controls on evaporative emissions would have "at least as great an effect as would stage three," it says.

"By 1985, manufacturers should have developed currently advancing techniques to achieve more durable and reliable emission control systems, combined with improved fuel economy at acceptable cost."

POLLUTION MONITORING IN PERTH CALLED INADEQUATE

Perth THE WEST AUSTRALIAN in English 23 Jun 79 p 11

[Text] The air-pollution monitoring programme in Perth was inadequate, the director of the clean-air section of the Department of Health, Dr A. G. Cumpston, told the "Perth--the impact of growth" seminar yesterday.

He said that continuing studies were needed, such as:

- A detailed inventory of the types of pollutants and their sources.
- A comprehensive monitoring programme.
- Analysis of the data from the monitoring programme so that the concentrations of pollutants under various weather conditions could be predicted.

The monitoring programme needed a number of permanent and mobile monitoring stations to find out the direction and the rate of dispersion of pollutants.

This information could be used with weather information to work out the type of conditions that produced unacceptable levels of smog.

Clean air was not inexhaustible.

"Its preservation should receive enough consideration to determine the location of particular industries and the performance of standards that must be applied to them," Dr Cumpston said.

The accumulated experience of the clean-air section of the Health Department had revealed abundant evidence of the

impact of growth on air quality.

Motor-vehicle pollution was the most difficult air pollution problem to solve.

Another major problem was various types of dust produced by places such as cement works, quarries, plywood factories, stock-holding paddocks and sand-blasting works.

ODOURS

A particularly difficult problem was the production of odours by various industrial processes.

Perth had long periods of sunny weather which favoured the formation of temperature inversions and helped produce smog, particularly from motor-vehicle pollutants.

But it also had other attributes, Dr Cumpston said.

Industrial areas and traffic routes were dispersed around the Swan River and Perth was the windiest city in Australia. It did not have raised land surrounding it.

So air pollution levels complied with the long-term goals of the World Health Organisation, except from the level of carbon monoxide, which exceeded the goal in some inner-city areas.

In the majority of cases dusty and offensive operations had been set up in locations that were considered appropriate at the time.

But the impact of growth affected the site of operations and caused the neighbourhood development of residential areas.

These two factors in many cases had changed an acceptable situation into an air-pollution problem.

The corridor plan for proposed development in the metropolitan area had an unpleasant advantage. It envisaged growth along the narrow coastal plain where sea breezes favoured the natural dispersal of pollutants.

"Unfortunately, the issue of air pollution as a determinant of land use is likely to remain low on the list of considerations," Dr Cumpston said.

CSO: 5000

AUSTRALIA

BRIEFS

RIVER POLLUTION--Industries in Ipswich and Brisbane were releasing chlorinated hydrocarbon wastes into the Brisbane River when water quality council inspectors were off duty, State Parliament was told last night. The claim was made by the Opposition spokesman for water conservation (Mr. Byrnes) when speaking to the Clean Waters Act Amendment Bill's second reading. He said fish and crabs had been killed by kieldren, arsenic, and other chemicals in the weekend discharges, but by Monday morning, all traces of the pollution had disappeared following five or six changes of the tide. Mr. Byrnes accused the State's Water Quality Council of excessive secrecy to defend industries against the public interests. The Bill passed all stages. [Excerpts] [Brisbane THE COURIER MAIL in English 6 Jun 79 p 11]

AGENT ORANGE BAN--A second council has suspended the use of the weedicide 2,4,5-T pending a report into its safety. Campbelltown City Council's town clerk, Mr Keith Garling, said yesterday that as there was some doubt about its safety, the council has decided to use alternatives to the spray. At the council's last meeting, he said, an alderman had asked that a report on any adverse effects associated with the poison be prepared. Council employees had been using the spray to kill weeds growing in drains, Mr Garling said. Blue Mountains City Council was the first to suspend the use of 2,4,5-T. Blue Mountains has appointed a working party of aldermen, council officers and two citizens to investigate it and the related poison 2,4-D. Blue Mountains Council banned the poison outright last year, but later rescinded the motion. Under pressure from residents, its use was then suspended to allow the working party to report. [Excerpts] [Sydney THE SYDNEY MORNING HERALD in English 26 Jun 79 p 2]

FLUORIDATION BACKED--At least 10 independent studies had failed to support an American report which claims a link between fluoride and cancer, the NSW Health Commission said yesterday. The American study says fluoride in the water supply creates a 5 per cent greater chance of dying of cancer. The Health Commission chairman, Dr. Roderick McEwin, said that in "every instance when this material had been exposed to proper statistical analysis, the conclusions have been found to be erroneous. Dr McEwin was replying in a letter to statements by Dr John Yiamouyiannis, the author of a controversial study claiming the link between fluoride and cancer. [Excerpt] [Sydney THE SYDNEY MORNING HERALD in English 27 Jun 79 p 3]

CSO: 5000

FOURTH SET OF NITROGEN OXIDE REGULATIONS ISSUED

Tokyo KYODO in English no time given 31 Jul 79 OW

[Text] Tokyo, 31 Jul KYODO—The environment agency Tuesday announced its fourth set of measures designed to reduce nitrogen oxide (NOX) pollution.

Smaller NOX generators such as gas generators and heating furnaces will fall under the guidelines for the first time. Large and medium NOX polluters such as metal and oil heating furnaces will be regulated by the new set of rules as well. NOX is one of the causes of photochemical smog.

The regulations will take effect 10 August for generators yet to be built. Existing generators will have three years before the regulations apply.

With the final uniform control measures on NOX generators, the focus of future anti-air pollution laws will shift to introduction of regulations on the total amounts of NOX in the Tokyo metropolitan area and other big cities.

NOX regulations began in August 1973 for steam power plants, ironworks and other large NOX generators to attain the environmental standard of less than 0.04 to 0.06 PPM.

The agency expanded the regulations' coverage in December 1975 and tightened the regulations on large NOX generators. A further expansion of the coverage was made in June 1977.

The fourth set of regulations will cover 92,000 generators, accounting for 73 per cent of all smoke generators.

NOX discharge is estimated to be cut by about 40 per cent in 1984 as compared with no regulation, according to the agency.

However, the fourth set of regulations will reduce NOX discharge by only eight per cent as compared with NOX discharge in 1977.

CSO: 5000

PHILIPPINES

BATAAN MILL ACTING ON COMPLAINTS

Manila BULLETIN TODAY in English 1 Aug 79 p 43

[Text] Samal, Bataan, 31 Jul--The Bataan Pulp and Paper Mill, Inc has assured local officials headed by newly appointed Mayor Emiliano D. Forbes that the firm will meet fully the requirements of the national pollution control commission (NPCC).

A company spokesman said the paper mill, with the present installation of diaphragm cells, will have spent some P24 million for its anti-pollution devices which perhaps no other establishment has done.

The pulp and paper mill has already constructed primary and secondary lagoons and installed 150 units of Kenic aerators and a blower costing around P15 million, it was reported.

The statement of the mill spokesman was made in answer to that made by Mayor Forbes who reportedly conducted a conference with fishermen and farmers of the town and alleged that the firm's industrial wastes were destructive to work animals and agricultural crops.--LNM

CSO: 5000

'NOVE SLOVO' DEVOTES ISSUE TO ANTI-POLLUTION PROBLEMS

Approach to Waste Management Discussed

Bratislava NOVE SLOVO in Slovak 7 Jun 79 p 4

[Article by Ludovit Weismann, Corresponding Member of Slovak Academy of Sciences: "A Slightly Different View on Waste"]

[Text] Today, domestic and industrial waste has become an extremely important worldwide problem. Basically this is an old problem, which was known even in ancient society. But today, as a result of extensive industrial production, its scope has changed completely.

Before the Industrial Revolution, wastes were primarily of organic origin. They were substances which microorganisms could easily decompose, liberating mineral substances for the biological cycle and thus for further life. But today, difficultly degradable wastes such as petroleum hydrocarbons, detergents and synthetic materials, for whose decomposition nature has not yet developed the necessary mechanisms, and substances whose decomposition takes hundreds or thousands of years (isotopes), are being emitted into the natural and living environments.

The growth of population and the proportionately rapid development of industry and agriculture have increased the quantity of wastes. For example, every year Czechoslovakia emits 6.3 million tons of wastes from industrial production into the atmosphere, including 2.9 million tons of solids and 3.4 million tons of gases. The most abundant substance among them is sulfur dioxide--2.8 million tons--while the remainder consists of hydrogen sulfide, carbon disulfide, fluorine, arsenic, nitrogen and chlorine compounds and the like. Some 90 percent of these emissions accumulate below a height of 200 meters, and 60 percent below a height of 50 meters. This means that these waste products accumulate in the most active part of the living environment.

In contrast to the past, wastes from agricultural production, primarily from the large-scale raising of poultry, hogs and cattle, which cannot be returned directly to the soil but require pretreatment or processing, are a problem. Rather large quantities are involved. The daily manure production of 400-800 head of cattle is 180-400 m³ and for 5,000-25,000 hogs 38-188 m³, while on poultry farms, where several hundred thousand birds may be concentrated, the daily output of solid waste is about 160 m³.

Man is beginning to become aware that the rate of decomposition of wastes is not proportional to their production, and that the equilibrium between the quantity of wastes and their natural elimination is increasingly disrupted. People today are concerned that wastes are being discarded into nature and emitted into water and the air, and are interested in their future and the effect of wastes on the natural and living environment, but also in their disruptive effects on the natural and biological processes and the resulting threat to the existence of man on our planet.

Wastes emitted into the atmosphere are clearly implicated in the increase in heart, respiratory, circulatory and other human diseases. In addition, they threaten the existence of other organisms as well, since poisoning by them disrupts biological and especially reproductive processes and, when they enter the soil, even disrupts the activity of microorganisms. Thus they limit the natural circulation of substances in nature and the development and multiplication of even those organisms on which human life is utterly dependent.

Wastes released into water sources have a similar unfavorable effect. For example, the increasing quantities of petroleum hydrocarbons in surface and sea waters are producing larger amounts of benzene and toluene in the bodies of fish, which is unfavorable for the production of roe and hence of fish.

A basic condition for the existence of human civilization is a decrease in the conversion of nonrenewable natural resources into wastes and the re-use of waste products, as well as limits on the disruption of natural processes by harmful substances in wastes.

Current science and technology are creating the conditions for limiting the quantities of industrial wastes discharged into the atmosphere, water and the soil to a bearable level. These include, for example, the introduction of closed, waste-free production cycles and the recirculation of water and air. The maintenance of discipline in production processes is an important factor in preventing the threat to the living environment from harmful substances in wastes. The elimination of solid wastes is posing greater problems for humanity, and although science and technology are assisting by developing equipment for purification, separation, treatment and disposal of wastes, the organization of collections, the storage of wastes and their recycling still present a problem.

The reuse of wastes produced by industry can be achieved in socialist society by requiring every production enterprise to strive to eliminate its own wastes and to engage in recycling. For example, a producer of automobiles would be required to try to reuse wastes to which his products are converted in the time following their transformation by the economic process.

More difficulties arise in the storage and disposal of solid wastes which are produced during the extraction, processing and utilization of natural raw materials and which take up agricultural land. The solution lies in recultivation and greening and in consolidating dumps of these solid wastes. Many such wastes could be used in the building industry and in construction given the cooperation of production and processing plants.

Another urgent problem is presented by wastes from plant and animal production. Several methods of solution have already appeared in the specialized literature; closed ecosystems with recycling of wastes either in the same system or outside of it seem to be the most suitable solution.

A particular problem is the recycling and reuse of wastes produced in households and in the third area. Accordingly we would have to include a fourth area along with the above-mentioned three; it would be involved with organizing the collection and reuse of wastes from the consumption and service spheres. This arrangement is motivated by the fact that the basis of all human activity and of man's economic and biological reproduction is the natural sources of matter and energy, which after passing through the economic production process, change to a wide variety of wastes. The concept of "disposal" of wastes is a fiction, since according to the law of conservation of matter and energy any waste must be deposited somewhere in the natural environment. The most suitable way of using wastes is to reuse or recycle the biogenic elements contained in them.

The existing system for organization of waste collection (the Zberne suroviny [raw materials collection] enterprise), which already has a long-standing tradition in Czechoslovakia, is the basis of the fourth area. The recycling of wastes will result in considerable savings for our economy. The reuse of 300,000 tons of old paper will mean the saving of 750,000 cubic meters of wood (and hence about 3,000 hectares of forest) in addition to an economy of about 9,500 workers and the energy used in transport, processing and the like. A ton of waste copper replaces 142 tons of ore in metallurgical production. The energy consumption for the production of crude copper melted down from scrap is a fifth that used in producing primary copper from ore.

But the same conditions have not been created for the reuse of all types of waste. For example, the use of scrap wood in the production of feeds elevated this waste, which previously was mostly burned, to the level of a raw material, and its price rose so much that feeds produced from it have become unprofitable to use in agriculture.

The task of this proposed fourth area would not, however, be only the purchase and collection of raw materials, but also the implementation of a system of classification of wastes produced by the secondary and third areas. The fourth area would in practice have to assure the "ecologization" of wastes, beginning with the organization of a system for classification of wastes even after they are processed. Its activity would also include education and training, which is one of the most important factors in preserving and creating the living environment. In order to master the task of the fourth area, economic theory must find categories which express the value of resources, wastes and biological reproduction, and on the basis of this create the tools for an economic policy of stimulating the economic process.

Eliminating Fly Ash at Handlova

Bratislava NOVE SLOVO in Slovak 7 Jun 79 p 5

[Article by Anna Stodikova, Deputy Chairman of MsNV [Local National Committee], Handlova: "A Thorny Path"]

[Text] Law No 35/67 of the code, which on the one hand establishes the responsibility of operators of equipment which pollutes the environment, but also establishes specific sanctions for the failure to create adequate conditions for environmental protection, has been in force for over 20 years. At the end of so long a period, it would be helpful to show by specific examples what kind of attention has been devoted to the problem of the environment and whether the results correspond to the intent of the law.

When we look at the Handlova mining operation in these terms we can hardly be satisfied. In the town live almost 18,000 inhabitants, whose working and above all living environment is constantly polluted by the electric power station, which produces 4,500 kilograms of waste ash per hour. (This figure is from measurements of fly ash deposition carried out in 1971 by ORGRES Ostrava.)

The electric power station in Handlova began operation in 1913 as a power station for the coal mines. Van Tongeren mechanical filters were installed to trap fly ash. It is entirely understandable that the filters, which have been in operation for 65 years, no longer can fulfill their purpose. This is attested by the fly ash deposition measured in 1971, but subsequent measurements from 1977 confirm the fact and sound an alarm. In the vicinity of the recently-constructed settlement, for example, the ash fallout amounts to an average 1935.3 tons per square kilometer. The maximum allowable amount for settlement areas is 150 tons per year per square kilometer. The Handlova electric power station burns primarily powdered coal from the Handlova mine. Given the current state of wear of the boilers and filters, improvement is to be expected only through radical measures.

But why is this a Gordian knot? Since June 1970 the local national committee in Handlova has been reporting the measurements of fly ash deposition made in Banska Bystrica by the State Technical Atmospheric Inspection. On the basis of the measured fallout values, the inspectorate proposed measures to solve the problems with precipitator equipment. However, the plant management refused on the grounds that in 1974 the plant would change over to heating with gas. Since then it has not made any progress, but rather has fallen within a charmed circle. There have been a few meetings, and the transactions fill several volumes. Critical remarks by the populace have accumulated; on the strength of these the local national committee declared a Monitoring Day in November 1973, when it turned out that work was not proceeding and that the responsible official of the general directorate of the Slovak Power Enterprises was seemingly not interested in how much dust was raised in Handlova or for how long.

The next inspection by STIO [State Technical Atmospheric Inspection] in 1974 confirmed that no measurements of the amount of fly ash from the boilers were being taken. At the next meeting, in June 1974, the responsible officials of ENO [Novaky Power Stations] declared the problem would be solved: the plant would be reoriented to supply only heat and industrial hot water for the use of the town's domestic enterprise; this would also result in a disruption of electrical power production while the boilers were being fitted with electrostatic precipitators. This was followed by further meetings in September 1974, February 1975 and March and May 1976. But all this discussion produced no results.

Because of the anger of the miners, who breathe dust when extracting coal in the mines and must also breathe it while on the surface, the inspectorate of the State Inspection of Atmospheric Protection in March 1977 issued its decision on the engineering documentation for the reconstruction of the precipitator equipment of the Handlova power plant and at the same time issued the documentation for the construction of a 115-meter smokestack, with the required planning to be done by 30 July 1977. What happened? Neither the Novaky Power Station Enterprise nor the general directorate of the SEP [state power enterprises] effected the production of the precipitators, and the Atmospheric Engineering Equipment Plant in Milevsko did not include its production in its agenda for the Sixth Five-Year Plan.

The paradox is that at a meeting in September 1975 the Milevsko works approved the delivery of equipment for reconstruction of the precipitators in the Handlova power station for 1979 at a value of 5 million korunas and for 1980 at a value of 8 million korunas. On account of its capacities, ZVVZ Milevsko [Atmospheric Engineering Equipment Plant] only tentatively included the whole order--13 million korunas--in its plan for 1979-1980, while not confirming final delivery. The orders for production of electrostatic precipitators for the Sixth Five-Year Plan considerably surpassed the plant's production capacities.

We informed the federal ministry of fuels and power of the situation in order that it might help with the purchase of the equipment abroad, since its production cannot be arranged in our republic. The ministry's reply is not yet known.

Thus it has continued to be a matter of words only. Nonbinding words, which guarantee nothing, as if the problem of fly ash in the Handlova coal mining area was of no concern to those who should be devoting considerable attention to the problem, as was emphatically requested by the 15th CPCZ Congress.

Cleaning Up the Hron River

Bratislava NOVE SLOVO in Slovak 7 Jun 78 p 5

[Article by Eng Michal Bugan: "Efforts for a Brighter Day on the Hron"]

[Text] Just a year ago the editors of NOVE SLOVO undertook an unprecedented task: that of finding the causes for the catastrophic pollution of the Hron River by oil at the end of 1977 and the beginning of 1978 and informing their readers concerning the guilty parties in Petrochema Dubova, who brought about

extensive pollution of the Hron, and about the results of the disaster. In such a situation it might seem that the best principle would be "silence is golden," or possibly that the blame for the disaster should be allowed to fall on objective causes. An article entitled "Black Days on the Hron" described what had happened and how: excessive delays in the construction of the wastewater treatment plant, tension in interpersonal relations, breaches of responsibility and discipline, which led to considerable losses to the national economy.

A year has passed, and the writing about the Hron and about Petrochema in Dubova is already much milder. No, the problem of protecting the living environment has not yet been solved in Dubova--nor can it be. It was paid too little attention for many years, and accordingly it will be necessary to invest tens or hundreds of korunas more. And this will naturally take a good many years. Nor has the possibility of further disasters been definitively ruled out, for this is not possible without a wastewater treatment plant and its protective equipment. However, this year Petrochema has done what was expected of it, and even a little more. The main program is the construction of the wastewater treatment plant. The manager and chief engineer of the enterprise, and its investments department which is serving as the investor, as well as Stavodindustria [construction organization] in Banska Bystrica, which is providing the buildings, Sigma Hranice, which is providing the equipment, and the Duslo Sala machinery installation plant, which is in charge of installation, have progressed so far in the construction of the mechanical and chemical stage of the plant that at the end of a year NOVE SLOVO is able to report the beginning of trial operation. We are not worried, because the obstacles to construction are ordinary and partial ones.

A number of obstacles have also surfaced in Dubova. At one time there were too few workers, at another too few machines; or deliveries of certain parts of the equipment were late, there were too few cranes for the installation work and so on. But none of the representatives of the organizations participating in the construction has doubted the importance of the project or the fact that the only solution was that of quickly overcoming the obstacles in its difficult course. For the enterprise's chemical equipment was running at full speed, without interruption.

What improvements in the Hron will result from the new treatment plant in Dubova?

Mainly the removal of a wide variety of harmful chemicals, primarily petroleum products, whose presence in the water is harmful and hinders self-purification of the water, which come from Petrochema's wastewater. In order for the wastewaters to comply in full with our strict standards, they will need an additional treatment in the biological stage of the plant, which is slated to be built as a special project at the beginning of the next five-year plan.

However, halfway through next year we will be able to report the elimination of one of the most important pollutants of the Hron for almost its entire length.

Another good thing also came from "Black Days on the Hron." Environmentalists and ornithologists have been much concerned over some black pools in the Dubova area, more specifically in the vicinity of Predajna, in which migratory birds have died (NOVE SLOVO wrote of this in the article "The Birds' Graveyard").

These pits, known as "tar pits," are storage areas for solid and liquid production wastes from Petrochema, which until recently had no facility for burning them. Since the end of last year, improvements have been instituted at one of the tar pits, and the storage area has been covered over as well as possible given available capabilities. The surface has been recultivated. Since the combustion plant which was built is even now incapable of handling all production wastes, another holding area for liquid tars must remain in operation. After the treatment plant is constructed, the Hron will flow on relatively clean as far as Slovenska Lupca. Here Biotika has been polluting it to an extreme degree for several years. But even this polluter is striving to eliminate the devastation of the Hron, which has already become unbearable: by the end of 1981 a greatly expanded treatment plant for Biotika's wastewater will go into operation. Just as in Dubova, previous results in carrying out the planned construction of the treatment plant in Lupca indicate that all concerned are aware of its importance. For example, last year Stavodindustria Banska Bystrica (the same construction organization as for Dubova) considerably overfulfilled its targets for winter work.

The expanded wastewater treatment plant for the Harmanec Paper Mills, which will be completed in 1981, will also be part of the overall concentrated effort to clean up the Hron. Last year the planned targets were overfulfilled in this project as well. Thus it is becoming a real possibility that the paper mills--which contribute about a quarter of the pollution of the Hron--will no longer be dumping large quantities of insoluble substances into the streams of Bystrica a few years from now.

In spite of the solutions to be found for the most important industrial polluters on the middle and upper Hron in the next few years, a good deal of work remains for the Seventh Five-Year Plan. In Banska Bystrica, the local wastewater treatment plant is only in trial operation--and a larger one is already necessary. Thus it will be necessary to expand the older treatment plant for the Zvolen sewage system and to build a plant for treatment of the sewage from Ziar nad Hronom.

The local treatment plants are frequently overloaded and accordingly are less effective. This is the result of greatly expanded dwelling constructing and the growing consumer and food industries, which are discharging increasing quantities of wastewater. The construction of additional important water treatment plants on the Hron is slated for the Seventh Five-Year Plan, and the construction of water storage areas, which would even out the annual flow of water and further improve the cleanliness of the Hron by their purifying effects, is being considered for the subsequent period.

Environmental Planning

Bratislava NOVE SLOVO in Slovak 7 Jun 79 p 6

[Article by Candidate of Sciences Milan Ruzicka: "Equilibrium in the Country"]

[Text] Man has in his hands the latest technical achievements for the development and transformation of nature. But these are not giving the expected results, because he has neglected to find out the laws governing the processes and phenomena in nature. A purely technical and economic approach is not enough. To this must be added an ecological approach, which is the basis for concern for man's living environment.

Man's relationship with the country during the period of the scientific and technical revolution is increasingly becoming a crisis situation. The crisis is an ecological one. One essential matter is the discovery of a correct balance between modern economic utilization of the country and its ecological potential. In his modern intensive utilization of the country (industrialization, urbanization and economic development), man is striving to increase the proportion of artificial ecosystems to the detriment of natural or seminatural ecosystems. The striving for increased cultivation of the countryside and intensified utilization of it is coming into conflict with efforts at biological balancing of the countryside, which is an inseparable part of a healthy living environment. It is not possible, for example, to achieve constant and continuing increases in agricultural production without observing a certain level of balance in the national structure.

The conditions for optimal utilization of the country must be based on ecological principles. They must be prepared by science, which is thus faced with new tasks. Specialized investigation of individual factors and phenomena within the country is insufficient: it is necessary to develop a comprehensive approach and to convert the results of basic research into applied form.

One such applied form of basic research research is biological planning of the country, which is a specific form of the comprehensive ecological study of the country with a specific degree of application for planning purposes. The term "biological planning for the country" stems from the long-range aim of planned creation of the conditions for preservation and development of the biological elements of the country, i.e. plants, animals and especially man and the human population.

The specific goal of biological planning is prevention by protection and creation of a living environment for man and organisms during the process of planning interventions and changes in the country. This encompasses the country's ecological foundation, with analysis and synthesis of the ecological characteristics of the country and evaluation of them, leading to suggestions for utilization of the country in accordance with its ecological characteristics.

The theoretical principles and methods of drawing up biological plans to form the basis of ecological evaluation of the territory for the needs of planning work have already been developed.

Studies and outline biological plans have already been developed for several areas: for the Orava, Liptov and Spis area, with special attention to protection of nature and the development of highway traffic within the framework of the TANAP general territorial plan for the development of the Liptovsky Mikulas area. A similar plan was developed for KRNAP following this model. Some partial ecological syntheses have been developed for Bratislava and its environs and for the Horna Nitra area, particularly in terms of the negative effects of pollution, along with a biological plan for the Turiec basin in terms of the development of highway traffic.

Ecological evaluation of a territory has been in use in urban planning work since 1969. It was used in the study of the Banská Bystrica-Zvolen area, in the outline area plan for Banská Stiavnica, and later in the construction of the settlement of Bratislava-Lamac (carried out at the expense of the city of Bratislava in 1975), in the residential section of Povazská Bystrica and the settlement of Rozkvet and the planning of the water distribution system on the Danube. Currently the bases for outline biological plans for the Liptova area, the North Slovakian Lowland and Banská Stiavnica with its recreation area are under development.

The current interpretation of area planning on the basis of Law No 50/1976 in the code gives a considerable broader range for the application of ecological considerations. Stress is laid on the need to improve, expand and systematically organize information and basic principles regarding the natural factors which hitherto been used at various levels and in different manners in planning. Area planning must start from the findings of the natural, technical and social sciences so that regulated construction throughout the state and individual areas will involve continual harmonization of all natural and civilizational factors.

Previous findings from the application of the principles of biological plans for the country in area planning and other planning work indicate the need to concentrate specialists in area ecological evaluation in a single working group within the planning organization.

Stavoprojekty [construction planning organizations] have created or will create city planning workshops. The working group for ecological evaluation participates in the development of area planning principles and documentation in co-operation with city planning groups.

It is important that area ecological evaluation be used even in working out the concepts for development, organization and utilization of an area at the area prognosis level. The KNV [kraj national committees] and ONV [district national committees] should require area ecological evaluations from those who secure area planning guidelines and documentation.

The purpose of area evaluation for a zone or residential section is to discover and evaluate the most important characteristics of an area and to set up the preconditions for ecologically optimal utilization of the area. At the same time, the broader relationships of the zone within the residential section should be reevaluated from an ecological point of view, which hitherto has not been done. The results of an area ecological evaluation are embodied in a draft

special ecological analysis, which also gives the first preliminary idea of the possibilities for using the area from an ecological point of view and helps to measure city planning conceptions against environmental concerns, thus making it possible to harmonize the interests of various branches of human economic activity with one another.

The practical incorporation of the results of basic research into the country's ecology by organizing working groups for area ecological evaluations is thus far unique among the CEMA member states and on the European scale. This experiment is being carried out in the city planning workshops of Stavoprojekt Banská Bystrica in cooperation with the Institute of Experimental Biology and Ecology, Slovak Academy of Sciences. In a short time, ecological evaluations have been worked out for the western settlement zone in Rimavska Sobota and for the larger territory affected. Currently, work on the evaluation of the residential sections of Safarikovo and Velky Krtis is under way. Additional guidelines for the creation of a residential green area in the planned Rudlova-Sasova zone and documentation for a recreation area for the city are being developed for Banská Bystrica.

The first steps have been taken. In measuring theory against practice, further possibilities for creative development of ecological concern in planning activity have already been identified. These viewpoints will be used to a much greater degree in the case of large areas, where cooperation with Urbion is expected. The first contacts have been made in the development of a model area forecast for the Levoc area. The results thus far obtained in developing draft studies for the biological plan for the East Slovakian Lowland and the Liptov Basin indicate great prospects and the real possibility of using ecology to solve problems of protecting and creating the country.

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GERMAN DEMOCRATIC REPUBLIC

ENVIRONMENTAL PROTECTION MEASURES, PHILOSOPHY DETAILED

Domestic Achievements, International Cooperation

East Berlin EINHEIT in German Vol 34 No 7, Jul 79 signed to press 6 Jun 79
pp 730-732

[Article by Hans-Albrecht Luetke, economist, Director, Environmental Protection Department, Ministry for Environmental Protection and Water Management: "Environmental Protection in the GDR"]

[Text] The development, on a priority basis, of our material-technical base, especially of our material and energy economy, for strengthening our economic performance for the good of the people, the purposeful realization of our party's social policy, the rapid development of urban construction and of our infrastructure and, not last, the introduction of industrialized production methods in agriculture, forestry and the foodstuffs industry require a high and increasing use of our natural resources. It explains the importance of environmental protection. Our party assigns great importance to it. For assuring optimum environmental conditions, that is, for the protection of the environment, the ninth party congress decreed demanding tasks orienting to high economic efficacy through a rational use of our not unlimited natural resources and to high material and energy economy through constantly improving working and living conditions, especially also the development of health protection, recreation, sports and tourism.

What are the initial values and interconnections that have to be taken account of in this requirement above all on behalf of getting the highest effectiveness out of the means employed?

Population: With a population density of 157 inhabitants per square kilometer the GDR belongs among the densely settled countries of Europe. More than two-thirds of our population is urban. The greatest population density is found in the industrially highly developed southern bezirks of the GDR. It means that 54 percent of our total population, which produces roughly 67 percent of the GDR's total industrial production, lives in the industrial bezirks of Halle, Leipzig, Cottbus, Dresden and Karl-Marx-Stadt

and in the capital Berlin, in an area comprising 32 percent of GDR territory. This population and industrial concentration causes both a most intensive use of the natural resources and a concentrated yield of by-products of all kinds in these areas.

Territory: Almost 60 percent of GDR soil is under the plow. For farm production, to insure the population's food supplies, we only have a 0.37 hectare acreage per capita. That turns into a permanent task for us the improvement of soil fertility, the rational use of the acreage available, its accurately computed utilization for cultivation and the restoring of former mining areas through recultivation. Forests cover 27 percent of the total GDR territory, and water covers 2 percent. The forests and the water, in addition to their great economic importance, fulfill considerable health and recreational functions.

Domestic primary energy sources: Lignite, extracted through strip mining, is the GDR's primary energy source. That, as well as the generally increased use that has to be made of domestic fuels and raw materials, results in consequences for the working of agricultural and forestry acreages for mining purposes, for keeping the air clean and for the use made of the bodies of water.

With the directive on the five-year plan 1976-1980 to develop the national economy, comprehensive measures also were decreed for the protection of the environment, for keeping clean the bodies of water and the air, the protection of land, the reduction of noise, and the utilization and disposal of waste products.

What has since been achieved?

While the economy has made increasing use of the water resources, the condition of surface water has, for all intents and purposes, remained what it was in 1975.

Dust emission diminished by 42,000 tons. In response to the task assigned in the ninth party congress directive, of developing efficient waste-gas purifying methods to keep the air clean—which also, in particular, includes the desulphurization of fumes—the limestone additive procedure was tested at a large scale.

For the preservation and effective use of the land resources, during the first 2 years of the five-year plan circa 40 percent of the acreage earmarked for recultivation has been reclaimed.

Advances also have been made in the collection, recycling and innocuous disposal of by-products. The recycling intensity of massively accumulating by-products has been considerably increased. More sewage sludge has been regularly deposited, eliminated without hazard or reused.

In what directions are we now concentrating our efforts toward further improvements in environmental protection?

Further measures for reducing the sewage strain, dust and noise pollution, the thermal stress on the environment, the reduction of sulphur dioxide emission and the abatement of motor vehicle exhaust gasses are concentrated on the industrial conurbations in order to raise, as a priority, in these concentration points of the workers class, the effectiveness of the economic reproduction process while further improving the working people's working and living conditions.

The strain of smoke and dust, mainly that of sulphur dioxide and fluorine, is systematically being countered by environmental protection measures in the field of energy--in exploiting primary energy sources and their conversion into usable energy, transshipment, transportation and the rational employment of energy sources.

Measures for accommodating agricultural and forestry production to given stress situations are systematically being continued.

Great efforts are being made toward making more use, in conformity with the progressive state of science and technology, of all waste products and secondary raw materials. This turns environmental protection into an important factor of the raw materials and materials economy.

Through a thrifty use of built-up areas, the recultivation of former mining areas and the cultivation of barren land and waste land, our agricultural and forestry acreage is being maintained in size.

Our scientific-technical lead time is oriented above all to technologies exploiting much raw material and energy, effective restraints of noxious substances and the use of waste products. The special importance here, as everywhere else in the economy, lies in a fast and efficient application of scientific-technical data.

In order to insure the usable capacity of the water resources, we must make rational use of water, especially in industry, that is to say, we must continue to reduce all specific water consumption by optimizing the cycling of water, using purified sewage for subsequent production, and introducing more technologies that do not require much water or no water at all. The reuse of water in the river areas calls for optimum modes of operations in the extant filtration plants, targeted reconstructions and the setting up of new capacities in the major stress junctures.

In order further to reduce environmental stress, great attention must be given to constantly improving the utilization degree of waste products and secondary raw materials. To that end it is necessary systematically to expand new applications for a number of waste products. The emphasis is placed here on getting more nonferrous metal from dust and slush and more of a use out of old tires and waste oils and from the scraps of synthetics and lumber. In addition there is the task to make more use of the waste products of the foodstuffs and luxuries industry for livestock feed production.

Scientific-technical development in the field of environmental protection in the GDR is principally oriented to the elaboration and application of energy and material saving technologies that either are low in waste products and sewage or produce no waste products and sewage. By reducing the specific material and energy use and the volumes of waste and energy losses a significant contribution is made to an efficient use of the natural resources and their availability is assured over the long run. In combination with special environmental protection measures (restraining, purification and regeneration technologies, recycling and the reuse and further processing of material), environmental stress is thereby diminished or avoided as it occurs, in particular, in producing domestic raw materials and fuels, in the conversion of material and energy, and in the industrial utilization of water.

Of special importance is the development of methods and designs for reducing noise and vibration emissions for products in machine building.

Indispensable to coping with the extensive tasks in the field of environmental protection is the deepening of international cooperation.

The GDR sets great store by increasing the efficiency of multilateral cooperation, of a meaningful and advantageous division of labor, specialization and cooperation within the scope of CEMA. Environmental protection is a firm component in the development of the CEMA countries, and all measures and programs scientific, technical, economic and legal in character, pertaining to the organization of environmental protection, and to the supervision, prevention of, and fight against, environmental pollution are derived from that.

Proceeding from the complexity of the problems in environmental protection, that is, the systematic combination between the interests in accelerated scientific-technical progress and a prudent attitude taken by society toward nature, the CEMA countries are planning and implementing measures for the protection and shaping of the environment and for maintaining the natural climatic conditions and the equilibrium of the natural ecological systems. The "general comprehensive cooperation program of the CEMA member countries and Yugoslavia for up to 1980 in the field of the protection and shaping of the environment and the rational utilization of the natural resources," which was presented by the CEMA committee for scientific-technical cooperation and ratified by the executive committee in 1974, contains 12 complex problems (directions) which combine 159 research projects with a great number of tasks. At present, this cooperation proceeds, within the scope of this program, through 17 permanent CEMA commissions and 10 councils officially empowered in terms of the various problems. In addition to that comprehensive program, main trends for the scientific-technical cooperation in the field of the protection and shaping of the environment and for the rational utilization of the natural resources for from 1981 to 1990 also were elaborated and ratified by the CEMA executive committee.

CEMA is making a great contribution to implementing the principles and accords set down in the Final Act of CSCE, including the tasks contained in the section on "cooperation in the areas of the economy, science and technology and the environment." It likewise is developing its participation in the environmental program of the UN (UNEP) and its cooperation with UNESCO, the UN Economic Commission for Europe (ECE) and other international organizations.

Of special importance to the GDR is the scientific-technical cooperation with the USSR in the field of environmental protection, based on signed long-range agreements. Agreements on direct cooperation also exist with Poland, Bulgaria and Hungary.

Furthermore, the GDR is also promoting cooperation with states of a different social order in the field of environmental protection, in accordance with its UN membership and the obligations resulting from the stipulations of CSCE. It endorses the summoning of an all-European conference, as proposed by the USSR, on matters of cooperation in the field of environmental protection. One may surely expect of such a conference new impulses for deepened cooperation by the interested states based on mutual advantage and on the full preservation of their sovereignty.

West German Commentary

Bonn IWE-TAGESDIENST in German No 104, 9 Jul 79 p 2

[Report from Berlin: "SED Considers Raw Material and Environmental Problems Soluble in Future." A translation of the East Berlin EINHEIT article referred to below follows this commentary]

[Text] The SED finds that the growing shortages of, and the rising prices for, raw materials and fuels and the strain on the environment by man are no "reasons for existential anxiety." The resource and environmental problems are "soluble," as the theoretical party journal announced, in delimitation from Western "ecological pessimism." To that end, to be sure, the attitude toward nature that was excessively eating into the natural resources and becoming an increasing strain on the cycles of nature should have to be changed fundamentally and overcome and eventually be replaced by an attitude toward nature that would foster the regenerative forces of nature, consume the resources taken from nature without leaving any residue, and return the waste products to production. In taking account of the "internal developmental logic," future prospects were "by no means gloomy." An increased realization of closed resource cycles would make possible a more or less resource-saving economic growth that also would be easy on the environment.

For the foreseeable future EINHEIT expects of the energy sources and raw materials to show a "trend of becoming more expensive" and expects "not inconsiderably higher expenditures" for environmental protection. All possibilities of scientific-technical progress should have to be used to counter such trends and cope with their economic consequences. (EINHEIT 7/79).

Socialist vs. Western Approach

East Berlin EINHEIT in German Vol 34 No 7, Jul 79 signed to press 6 Jun 79
pp 702-712

[Article by Prof Dr Harry Nick, economist, research program director,
Institute for Political Economy of Socialism, Academy of Social Sciences,
SED Central Committee: "Man and the Environment"]

[Text] While making a strong point of the long-range trends in the changing relations between society and nature, the article shows that implementing an economic growth that would be easy on resources and on the environment requires mainly more efficient forms for the reproduction of the potentials of nature utilized economically. Constructive solutions demand for the relations with the natural environment to be explored in their connection with the scientific-technical progress and, above all, with the socioeconomic relations and factors. Coping with such global problems requires above all a resolute implementation of the policy of peaceful coexistence and, ultimately, overcoming the rule by the monopolies.

Thinking about the future requires above all seeking clarity about the developmental tendencies of all the objective factors and conditions through which men engage in their social process of life, that is, about the changes in their environment in the comprehensive sense. In a few decades it is likely going to appear strange to many of us that it was taken for granted in the 1970's that the natural environment of man was meant when the talk was about the environment as such. And the explanation for that is likely to be found mainly in these two circumstances: in the growing awareness of essential changes in the relations between society and nature and in the most spectacular ways and means by which bourgeois ideology reflected those changes. Most assuredly, not only because of deep theoretical insight but mainly also as a consequence of the practical experiences gained in the systematic alteration of the human environment, the awareness of the unity of all spheres of this environment and of the interchange among them will be much more highly developed than is generally the case today. And, with it, this will be another confirmation of the fruitfulness of the Marxist-Leninist idea of the material unity of the world.

Man is both a biological and social being. He gains increasing mastery over nature and yet remains part of it. He can exist only within a certain natural environment and must change nature through his work--this most important and specifically human activity of life--and transform natural resources into useful values through which he satisfies his needs. This he can do only in community with other people, and the kind of his relations with others--mainly determined by the nature of political power and the

property relations--controls the specific purposes and impulses of production. It means man's environment has three basic spheres: (1) the natural environment, that is, the soil and its composition (the lithosphere), the hydrosphere, the atmosphere, natural life (the biosphere) and--since recently--the cosmic sphere, space close to the earth; (2) part of man's environment also is nature as transformed by human labor, the totality of the materially embodied existence and developmental conditions of society, created through human labor, it being its material-technical base or the technical environment; and (3) among the objective factors of the social process of life also then is the social environment, that is, the totality of the social and societal relations of men and their institutions, which is exercising increasing influence on the other two spheres.

The essential point here is that these three spheres are found to be in an intensive dialectical interaction and that they turn into each other in specific ways, so that consequently none of them can be examined apart from what connects them with the others. Disregarding that fact explains the main theoretical-methodological error on which bourgeois ecological pessimism is based.

Let us first take the relations between the first two environmental spheres. The technical environment is nature changed through human labor. It is, as it were, the "second nature" man has created, the "artificial," reified environment. The elevation of the material-technical base, of the objectified elements of the productive forces, is the deepest source of human progress, it being the elevation of the human species altogether. The objectified aspect of "social inheritance" it is which distinguishes man from all other living beings. This social inheritance along the line of the reproduction of the material-technical base proceeds in dialectical interaction with the accumulation of knowledge and experiences which are constantly being enriched and handed on from generation to generation. This "artificial" nature cannot be separated of course from original nature for it ultimately is nothing else but nature transformed. And what is this so-called primary or original nature--the woods, the soil, domestic animals, useful plants and water? Nature untouched by human hands it no longer is. Over many generations it has been shaped and altered by human labor. It follows from all this: to think about the processes of primary nature without reflecting on the premises and effects of scientific-technical progress makes no sense.

Nor can the processes that change the objectified environment (the natural and technical environment) be understood apart from their connection with the social environment. The relations between man and nature in the widest sense, far from being of a "natural social" character--even if in the process of confrontation between man and nature natural laws and social laws do take effect--are clearly and exclusively of a social character. The aims and purposes in this process are set by man and are solely related to man. This is a fact that some bourgeois publications like to forget, cover up or deny, obscuring the matter to some extent even by the term they are using, the term "environmental protection" that has gained general

currency. The widespread distinction of plants and animals in terms of being either "useful" or "harmful" which is gaged against their immediate utility to man surely no longer does justice to the understanding we have of nature today. Too deep has our knowledge become of the complicated interactions and equilibria in nature for still accepting such oversimplified value judgments. Too much awake, however, also is our awareness to the beauty of nature and to the irretrievability of any extinct plant or animal species for us to refrain from any conceivable effort at preserving the variety of species in the plant and animal kingdom. None of this eliminates the fact that we are ultimately concerned, not with the protection of nature, but with preserving man's natural conditions of existence, the present ones as much as those for the future generations. And again this is not a matter of protecting nature in the sense merely of warding off negative effects on our natural environment, but a matter of purposefully implementing rational, effective forms of reproduction of the economically used potential of nature.

All this means is that in all our thoughts about shaping the relations between nature and society the elaboration of a definite theoretical-sociological conception must have primacy, because the control over these relations is exercised by society and in its interest, that is, in the interest mainly of the classes that hold the economic and political power. It is therefore necessary for the "global processes to be shaped, not merely as ecological, economic or political processes, but mainly as complex processes that carry with them the changes in social relations."¹

Relations Between Nature and Society Are Determined by the Production Relations

All our historic experiences are teaching us that the relations between society and nature are just as reasonable or unreasonable as society is reasonable or unreasonable in the way it is organized. The capitalist society, oriented to the profit of private capital, is anti-nature in its essence, and this for two reasons:

First, capitalist private property has the tendency relentlessly to exploit the free gifts of nature. This holds true also for factors that make for expenses, for society yet not for private capital. And that mainly includes, along with the working people, the natural environment. "Capitalist production thus develops technology only while it at the same time undermines the sources of all wealth: the land and the workers."²

Second, capitalist production relations stand in contradiction to rational relations between nature and society because the profit economy is always oriented to the most immediate advantage, while economic growth that is easy on the environment presupposes a deliberate respect mainly for the long-range effects of our interfering with nature.³ The classical authors of Marxism-Leninism have emphasized time and time again that a truly reasonable relationship with nature, borne by the responsibility to future generations

too, will be possible only after capitalist private property is abolished. "From the standpoint of a higher form of economic society, some individuals' private property in the earth will appear as tasteless as a man's private property in another man. Even a whole society, a nation, indeed all contemporaneous societies taken together, do not own the earth. They have it as beneficiaries and, as *boni patres familias* (Author: good fathers of families), have to leave it in an improved condition to subsequent generations."⁴ That "improved legacy"--which of course far exceeds certain improvements of the environment in capitalist countries as performed under the pressure of public opinion and in the interest of the capitalist class as a whole--can be a genuine concern of society and arise out of the given production relations only where the elevation of the people's material and cultural standard of living is altogether the objective goal of production. That the relations between society and nature are in their essence conditioned by the production relations simply is the result of their being an increasingly important element of living conditions, of men's way of life. For that reason socialist society cannot settle for merely countering the strains on the natural environment, rather it must--to the extent that it finds it economically feasible--strive for gradual improvements also in this field of the working and living conditions. And thus the tasks for the protection of the natural environment occupy an important place in the programs of the socialist society. "It is necessary to preserve nature as the source of life, material wealth, health and joy of men and to make use of it rationally, on a scientific basis, so that it may serve the safe and happy life of future generations in communist society. Through effective social efforts in protecting the soil, keeping air and water clear and reducing noise, better conditions are being created for work and leisure."⁵

"World Models" and Their Faults

There can be no doubt that approaching an understanding of the real problems that have to be solved today in the relations between society and nature is possible only if one proceeds from the production relations, from that there exist different social orders. The series of published studies coming out since the early 1970's in rapid succession, mainly commissioned by the Club of Rome, on global problems in using the natural resources, ecology, population development and economic growth, frequently declared to be "world models" by the authors themselves, all suffer from the lack of a scientifically sound philosophic-social conception. That finds its expression in that not only there is hardly any attention paid in these "world models" to the real social conditions in the contemporary world and the problems of the ecology and the demands made on resources are contemplated "in and by themselves," but principally also in that most obvious theories of bourgeois philosophy and sociology have spawned these world models.

There is only one basic thesis that is reiterated in all these studies: Economic growth was more and more running up against definite limits set by nature. If this tempo of economic growth were to be maintained and population growth were to continue as before, the exhausting of the natural

resources and the destruction of the natural environment were bound to lead to a global catastrophe within a relatively short time of history. A rapid shrinking of the economy and of the population was compelled by objective circumstances. Ultimately there was the danger that the natural preconditions for the survival of the human species on our planet would be destroyed altogether. The way out would have to lie in a worldwide cutback in economic growth and population development.

The differences in the various studies lie mainly in the conclusions drawn. While in the first "world models" (by Jay W. Forrester, 1971,⁶ D. Meadows et al, 1971⁷) there still was a demand raised for some "worldwide equilibrium," that is, a general reduction of the tempo of economic growth, the Second Report to the Club of Rome (Mihailo Mesarovic and Eduard Pestel, 1974⁸) recommends a so-called organic growth. Thereby was meant a diverse yet worldwide coordinated growth in the various regions of the world. Thereby they mainly wanted to respond to the objections from the developing countries against the so-called global equilibrium, which would of course mean nothing else but simply fixing contemporary relations on the levels of technical and economic development. The Third Report to the Club of Rome (under the direction of Jan Tinbergen, 1975⁹) mainly treated questions of the international order of economic relations. The matters of the limitations in natural resources and of ecology play a relatively minor role in that book.

To a certain extent the reports to the Club of Rome do reflect real processes; yet their general conclusions cannot be accepted. False and undialectical mainly is the more or less clearly pronounced thesis that nature sets absolute limits to economic growth. The limits of economic growth are always relative. They are determined by the given state of development in the productive forces and are steadily being pushed out further, mainly through scientific and technical progress. Crucial in the final analysis is which developmental possibilities are offered by any given production relations to scientific and technical progress and whether or not they make possible placing such progress systematically at the service of man. It also means that the problems that have to be coped with in the field of environmental protection are not--as the proponents of the thesis of "limits of growth" pretend they are--an argument against but one in favor of economic growth. To the extent that our economic capacity increases we will be able to do more also, for example, for clean air and clean water.

The recommendations of the authors of the reports to the Club of Rome are negative, and not constructive, in their basic content. A slowdown in economic growth, let alone economic stagnation, will by no means be a way for solving complicated problems in the relations between nature and society. And even so, the premises accepted by the proponents of the limits of growth, that way a catastrophe could only be postponed and not actually prevented.

The fault of such conceptions, for one thing, lies in that the relations between the natural and technical environments are presented in a most one-sided manner. There is a detailed exploration of the stress effects by

economic growth, and by scientific-technical progress on the natural cycles. But one finds a criminal neglect of the growing possibilities produced both by economic growth and scientific-technical progress for a more rational and effective reproduction of the nature potential, even though the proponents of those conceptions are unwilling to admit it.

The objections that have to be raised against the proponents of this ecological pessimism are not directed against the facts they refer to. There is a commendable wealth of material in the reports to the Club of Rome about the strain under which the natural environment is placed and on the taxing use of the natural resources. One thing that shows is that competent natural scientists and technicians also have involved themselves in such studies, and it is perfectly legitimate to believe they are worried about the destiny of future generations. What the authors of such studies must be blamed for, however, is that they launched their investigations only in specific directions from the outset and that they have overdone their method of extrapolation, of simply computing and computing and extending specific developmental tendencies. It was perfectly right to confront those pessimistic prophecies with the following example: If by the same method someone had tried circa 100 years ago to compute the effects of the development of urban commuter traffic in the city of London, which in 1870 was handled exclusively by horse and buggy, a side effect of that computation would have been that the city of London could not possibly survive the century to come because by then it would have disappeared under a big pile of horse manure. Extrapolations of this kind are of course scientifically untenable as evidence procedures. In principle it is impossible to come out with long-term prognoses about social developmental processes without at the same time also prognosticating on qualitative transformations in the technical environment and in the development of the productive forces altogether. And that, in turn, again is not possible without a prognosis on the development of social, societal and political relations.

New Elements in the Relations Between Society and Nature

There are mainly two qualitatively new elements in the relations between society and nature:

(1) The tempo in the consumption of raw materials and primary energy sources (coal, petroleum, natural gas) has increased so much that one would have to expect the raw material sources to get exhausted if traditional extraction methods are maintained unchanged. That is inevitable in view of the fact that in the three decades since the end of World War II as many mineral raw materials have been consumed as in all of human history up to then, and that the consumption of fossil fuels in the last 30 years of our century is going to be as large as between the years 1 and 1970 A.D.

(2) The effects on the natural environment by man have reached a global scale. That means, natural equilibria, like the physical and chemical composition of the atmosphere and the oceans, which had formed through millions of years, were measurably changed within a few decades.

The solution of the raw material and energy problems and the protection of the natural environment have become global problems for mankind. Because global precisely means that this whole matter of interaction between man and nature covers the whole earth, a subject confronting all humanity. Positive changes, therefore, can come only through worldwide cooperation among the states and peoples. It goes without saying that the socialist states are contributing their share also to solving the global problems of mankind.¹⁰

Resources and environmental problems are soluble. The truth is that the ecological pessimism in the Western world stems from the general crisis in the bourgeois-imperialist perception of the future, and not from an analysis of the real processes in the interaction between nature and society. These "arguments" that seem to support that pessimism directly stem from the fact that bourgeois ideology is not in the position to analyze the real interactions between the natural, technical and social environments and largely confines itself to an analysis of occurrences in the natural environment. In such an approach pessimistic conclusions are patently unavoidable, because the means and methods for solving the resource and environmental problems do of course not lie in nature itself but in scientific-technical progress and--at their bottom--in the changes of social conditions. The realistic-optimistic understanding of these matters that is typical of the Marxist-Leninist social sciences results precisely from its materialistic, holistic approach to the analysis of the interactions between the natural, technical and social environment.

Scientific-technical progress is the main factor in reducing the energy and material intensity of production. Let us consider the problem of energy and raw material resources. Over the long haul the progress of science and technology here will mainly have the following effect:

First: The economically usable resources are being enlarged by more purposeful geological exploration and increasing efficacy of the technical means used for it. Although, in fact, the consumption of energy sources and raw materials has greatly increased, chiefly after World War II, usable reserves explored frequently increased still more rapidly. For instance, according to American data, this is how the reserve supply of many raw materials was boosted in the nonsocialist world from 1950 to 1970: in petroleum, from 21 to 35 years; in natural gas, from 27 to 45 years; in coal, from 430 to 600 years, in iron ore, from 125 to 150 years; and in chrome ore, from 52 to between 350 and 400 years.

They are furthermore enlarged through the expansion of the field within which raw materials can be explored and made economically usable. Today, raw materials are extracted almost only from the upper crust of the continental strata. The deepest drilling right now goes no further than some 8 km, that is 0.1 percent of the earth's radius. The exploration of raw material deposits under the ocean floor, which covers seven-tenths of the earth's surface, is still in its infancy.

Moreover, the economically usable resources are being enlarged by the new kinds of natural resources that can be used economically. Even what has been called, for example, iron ore is a historic quantity that is changeable through progress in science and technology. Only a few decades ago, iron ore, in order to be usable, had to have an iron content of at least 60 to 70 percent, but today we can smelt ore that has an iron content of only 20 to 30 percent. Finally, the scope of usable natural resources is also being expanded qualitatively. This becomes especially clear in the case of the primary energy sources. In our century, coal has been joined by water power, petroleum and natural gas and, in the last few decades, nuclear energy. In the future, the use of solar energy, the heat from lower strata in the earth, tidal energy, and wind energy will be playing a greater role, with nuclear energy becoming increasingly more dominant. The solution of the energy problem, bound to succeed in the next century, will carry with it of course also improvements in the raw material situation in that the non-reproducible fossil fuels will then be available only for being used in the materials economy and, on the other hand, conversion procedures that are cutting down on the consumption of material but are more energy-intensive can be used in production processing.

Second: Increasing importance attaches to a more effective use of the raw materials and energy sources, that is, the reduction of losses occurring in the transformation and conversion of energy, reduction of the difference between the mass of material extracted from nature and the mass of material contained in the end product. Today "mankind utilizes in the end product only approximately one percent of the mass of the natural resources made usable."¹¹ Today already--that is also borne out by the experiences in our country--the efforts for a more rational use of energy and material must be given the priority over those that are aimed at boosting raw material production. After all, acquiring any given volume of raw material requires much greater efforts than measures needed for saving an equivalent volume of raw material.

It is certain that on the long run scientific-technical progress will lead not simply to enlarging the potential of usable natural resources and its more effective economic utilization, but to changes in the basic relations between society and nature. The core of these changes lies in the qualitative changes in the production relations, on the one hand, and between the natural resources and the natural environment, on the other. That will also mean a qualitative change in the type of technology prevailing today, which makes for a production that principally has an extensive approach toward natural resources, following a motto where, as it were, to produce means extracting large masses and volumes of material from nature and changing them superficially, while also producing vast amounts of waste products--that is, principally in their external form, their geometric configuration, mainly through mechanical procedures--using these changed natural resources for relatively short spans of time, and then returning them "to nature," as ballast. And producing more then means extracting still more natural resources, in more or less the same progression, from nature.

Understandably, the first kind of reaction to the increasing strains on the natural cycles was to prevent or reduce the harmful effects production had on the natural environment, and this by means of increasing investments having no other positive effect but the elimination of the harmful substances. But it is equally understandable that therein cannot lie the general ways and means by which to cope with the interaction between nature and society under these new conditions. The main thrust of our efforts must increasingly lie in fundamentally changing the relations between production and nature and not in eliminating, through steadily rising expenditures to boot, the consequences of a no longer appropriate attitude toward nature.

Friedrich Engels' warning appears as if it was addressed at our own decade, to the effect that we should not fawn too much upon our human victories over nature. We are "reminded with every step that we by no means dominate nature, as a conqueror dominates a foreign nation, as someone who stands outside of nature--but that, with all our flesh and blood and brain, we are part of it and amidst of it, and that all our domination over it means that we, distinguished from all other creatures, can comprehend its laws and apply them properly."¹² This extensive attitude toward nature, excessively consuming natural resources and increasingly straining the natural cycles--truly resembling, in fact, the attitude taken by a conqueror in a foreign land--must in its tendency, and gradually to be sure, be changed and surmounted fundamentally, until it finally will be replaced by an attitude toward nature which fosters the regenerative forces of nature, consumes without residue the materials taken from nature, transforms them into the material bases of use values, and returns the waste products to production. Literature refers to this change as the transition from open to closed natural resource cycles.

The Ecological and Technological Pessimism in Bourgeois Ideology and Its Roots

The ecological pessimism in bourgeois ideology results not merely from its failure of carefully enough examining the possibilities scientific-technical progress has to offer for improving the relations between nature and society. Rather, it is being supplemented and reinforced by an unequivocal technological pessimism. The main theses in bourgeois ideology about the future position of man in his environment directly result from this combination between ecological and technological pessimism. What they are saying is that technology, i.e. the "second nature" man has created, does more and more harm to original nature, that this artificial nature increasingly burdens man and bars his access to original nature, alienates him from this nature, that man to an increasing extent finds himself imprisoned within the artificial environment he has created and finds himself thwarted in unfolding his creative forces and natural gifts; that this artificial environment has a rhythm that differs from that of the biological processes in man, that this mainly had caused the so-called sicknesses of civilization and so forth. In its totality, they say, the artificial environment was obeying its own laws with effects that were increasingly turning against nature, and against man in particular.

In part these theses result from class-conditioned ideological-theoretical misinterpretations. But in part they also reflect real processes in the capitalist application of technology and, finally also, an objectively existing type of technology as it has been developed throughout the centuries of capitalist development.

If one tries to prognosticate the changes in the relations between nature and society solely in terms of the possibilities revealed by the internal developmental logic of technology, future prospects are by no means gloomy. An increased realization of closed resource cycles will make possible a more or less resource-saving economic growth that will also be easy on the environment. Nonmechanical procedures, including biochemical and biophysical processes, are going to play an ever greater role in production. To an increasing extent technological solutions will be applied that support and accelerate natural processes, enhance their degree of economic efficacy, as it were. Likewise, on the long run there will also expand the technological premises for improving the substance of labor, that is, heavy physical labor hazardous to health and monotonous intellectually will be reduced, and it is going to be enriched with intellectual-creative elements. Moving step by step ahead, mainly to the degree of the ripening of the socialist society and, in particular, the growth of its economic potentials, a technology of truly human dimensions will be generated in the sense that such a technology will more and more be conceived in human terms, aimed at improving the efficiency of labor, the labor conditions and the interactions with the natural environment.

For the long run man has no reason for existential anxiety, as far as his relationship with nature is concerned. Also with regard to the energy, raw material and environmental problems the words of Marx will turn out to be right, to the effect that with the rise of contradictions the possibilities for coping with them also rise. Only that this all does not have to happen at one and the same time, of course. There are many indications that for the foreseeable future we have to expect for the energy sources and raw materials a trend of becoming more expensive and have to expect not inconsiderably higher expenditures for environmental protection. All possibilities of scientific-technical progress will have to be used to counter such trends and cope with their economic consequences.

In general nothing will change the fact that the historic progress of mankind ultimately depends on expanding man's domination of nature. Only that this at the same time will also include qualitative changes in the relations between society and nature, among which simply also belong newly arising contradictions, strong dependencies on nature in part which may hold sway throughout relatively long periods of time. There is no doubt that the resources available in energy sources and raw materials will crucially control our advances in the field of rational energy and material use through the speed our economic growth can possibly reach, and that nothing in this will change either in the foreseeable future. One of the central tasks of science and technology is systematically to push forward and broaden these limitations.

Our optimism about the future in these matters of the relations between man and nature is ultimately based on the conviction that man is a reasonable being, that he can reasonably make a place for himself on his planet, and the progress of the productive forces is as boundless as the progress in establishing and perfecting objectively necessary reasonable social relations.

This ecological pessimism of bourgeois ideology is not only nourished by its technological pessimism. Both have their causes in the inability of bourgeois ideology to provide a scientific explanation for the societal and social forms in which the productive forces move ahead. If the sociopolitical statements made by the authors of the studies for the Club of Rome, or the importance of these studies for the sociopolitical sense of identity in the bourgeoisie, are examined, at least the following observations result:

(1) These studies, in their origin and concern, are more than essays on questions of the ecology, the natural resources and economic growth. They doubtless are among the more serious attempts by bourgeois ideology to establish a "survival strategy" of the capitalist system in a changed world, on theoretic grounds. And this is a world that has been changed not so much by enormously higher world market oil prices and by the increased strains placed on the natural environment, but mainly by shifts in the international balance of power to the disadvantage of imperialism. Much that was brought to light in these studies, and brought out from the deeper recesses of the bourgeois ideology, and that is combined with an analysis of certain global changes in the reproduction conditions of monopoly capital (mainly in the energy and raw material problem), evidently also is due, in particular, to the increasing sense on the part of the more far-sighted representatives of the capitalist world that "extending" the fundamental tendencies of world development is bound to increasingly jeopardize their system.

(2) Both in their analysis and in their conclusions the authors of these studies ignore or slight the fundamental differences between capitalism and socialism and the importance attached to the relations between these opposing social systems for coping with the global problems of humanity. Remarkable is the insouciance with which the authors of these studies declare as valid for the whole world the conclusions derived from their investigations of the capitalist part of the world. And their recommendations of "global solutions" make it appear as if our world were politically homogeneous.

The fundamental socioeconomic contrast in our world, as far as the authors of those studies are concerned, is between "north and south," that is, the contrast between the economically highly developed countries, most of which are in the northern hemisphere, and the countries of the so-called third world, which are mainly in the southern hemisphere. Looking at the competence of these authors, it becomes apparent they did not simply commit bourgeois errors and were not just ideologues entranced by the convergency theory. What is evident is that the developing countries occupy an extremely important position, politically and economically, in the strategic considerations of imperialist ideology and policy.

(3) There is no way of ignoring the fact that this theory on the limits of growth had a lot to do with the capitalist economic crisis of 1974 and 1975--not so much in terms of its genesis but rather in terms of how it was marketed by the imperialist mass media. It is natural that at a time when in the growth rates a zero appears before the point (average annual growth of FRG industrial production between 1971 and 1975 was 0.8 percent), an urgent need arises for theories that would make "zero growth" appear to be reasonable, even naturally necessary in the literal sense of the word. The Club of Rome studies, in any event, have played a great role in the 1970's trying to do their level best in doing the bidding for capitalist economic mismanagement. To the extent that there was an economic revival then in the imperialist countries, the demands for limiting economic growth were afterwards reduced to relative terms or tacitly shelved.

(4) There are many rational elements in these studies offering handles for useful scientific exchange of ideas. That applies in particular to their probing the resources and environmental problems and their deliberations on how to control these global problems through the cooperation among states with differing social systems. Only that the latter type of considerations play a relatively small role in these studies, and no role at all in some of them.

Socialism Points the Way to the Future

Social realities unequivocally prove that there is little sense in even talking about global problems in environmental stress and the exhausting of resources, unless conclusions are drawn from it for implementing the peaceful coexistence policy and, particularly, for worldwide disarmament. And it is precisely in that sense that the Soviet Union and the other countries in the socialist community indeed have done most for coping with the global problems of humanity. Almost all essential disarmament proposals were initiated by them and implemented, essentially, by their tenacious struggle. This also includes such accords as the nuclear weapons test ban treaty in the atmosphere, in space and under water (1963), the agreement prohibiting the emplacement of nuclear weapons and other weapons of mass destruction on the sea-bed, the ocean-floor and the subsoil thereof (1971), the convention banning the development, production and stockpiling of bacteriological (biological) and toxic weapons and their destruction (1972) and the convention banning military and other hostile applications of means for affecting the environment (1977), which all touch directly on the protection of the natural environment.

The greatest obstacle for solving the global and environmental and resource problems is the arms race, fomented by the imperialist powers, mainly by NATO. For the demands on the resources and the strain on the environment are not so much the result of "normal" economic growth as they are caused by the massive transformation of productive forces into "destructive forces," a tendency that objectively inheres in capitalism.¹³

The terrifying scope in this systematic squandering of global resources is made evident by the policy engaged in by imperialist reaction and the consequences of that policy. The U.S. government spends for the development of its military power nine times as much as for education, health protection, social services, housing construction and communal affairs together. That, of course, also curtails the material possibilities for reducing environmental damage. This is all the more serious in that the United States is the greatest environmental polluter in the world. The United States, mainly because of its insane armaments production, bears the chief blame for the increasing scarcity of the natural resources. It consumes 40 percent of the natural resources of the nonsocialist world. And, not last, its military machinery constitutes a direct threat against the natural environment, testified to, for example, by the 125 fires and disasters of U.S. nuclear weapons carriers within the last 30 years.

The Soviet Union and the other states in the socialist community are setting an example for successful international cooperation for coping with environmental problems. In CEMA questions of environmental protection played an important role even before the spectacular studies of the Club of Rome were published. There has been a special organization for keeping bodies of water clean in CEMA since 1962. In 1964, a complex titled "protection of water bodies and the atmosphere from contamination by noxious substances" was included in the scientific-technical research coordination plan. In 1971, a multilateral accord was signed by the CEMA countries on scientific-technical cooperation in the area of "elaborating measures for the protection of nature." "Typical of CEMA activity in the field of environmental protection and resource utilization is its strict focus on practical results. Between 1971 and 1975 alone, more than 500 relevant research, projection and design projects and developments were successfully brought to conclusion within the framework of CEMA."¹⁴ Social practice in socialist countries proves that where society itself is organized reasonably, its relations with nature can also be organized reasonably. A prediction by Friedrich Engels has come true, to the effect that bringing about such reasonable relations between society and nature demands more "than mere recognition. It also demands a complete transformation of our prevailing mode of production, and with it, of our current (Author: capitalist) social system in its entirety."¹⁵

FOOTNOTES

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2. Karl Marx, "Das Kapital," Vol I, Marx/Engels, "Werke" (Works) Vol 23, Dietz publishing house, Berlin, 1962, pp 529-530.
3. Cf. Friedrich Engels, "Dialectics of Nature," Marx/Engels, "Werke," Vol 20, Dietz publishing house, Berlin, 1962, p 455.

4. Karl Marx, "Das Kapital," Vol III, Marx/Engels, "Werke," Vol 25, Dietz publishing house, Berlin, 1964, p 784.
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7. Dennis Meadows, Donella Meadows, Erich Zahn, Peter Milling, "Die Grenzen des Wachstums," Stuttgart, 1972.
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10. Cf. L. I. Brezhnev, "25th CPSU Congress--CPSU Central Committee Status Report and the Next Party Tasks in Domestic and Foreign Policy," Dietz publishing house, Berlin, 1976, p 69.
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13. Cf. Karl Marx and Friedrich Engels, "The German Ideology," "Werke," Vol 3, Dietz publishing house, Berlin, 1958, p 60.
14. R. A. Novikov, "The Socialist Community and the International Aspects of Environmental Protection," SOWJETWISSENSCHAFT--GESELLSCHAFTSWISSENSCHAFTLICHE BEITRAEGE, No 2, 1978, p 187.
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CSO: 7300

LIDAR DEVICE USED TO CHECK AIR POLLUTION LEVELS

Warsaw AURA in Polish No 4, Apr 79 pp 15-16

[Article by Jacek Walczewski: "A Lidar Device for Krakow"]

[Text] Many of the latest achievements of science and technology are being put to work for the purpose of environmental protection. For example, we have written articles about the use of satellite technologies and remote-sensing devices for these purposes. In our last issue we published an article about a Polish-made prototype sodar [sound detection and ranging] device, that is, a device used to measure atmospheric phenomena by means of sound waves. In this issue we will be describing a lidar [light detection and ranging] device, that is, an instrument which uses laser beams for similar purposes.

The problem of air pollution is most often viewed in terms of the damage done by two factors, i.e., emissions, that is, pollutants which are ejected into the atmosphere from chimneys or other sources, or fallout, that is pollutants which fall to the ground and are injurious to people, plants, buildings, and so on.

However, something happens to these pollutants during the interval between the point where they are ejected into the atmosphere and the point at which we record the arrival of this unwelcome guest on the ground. Namely, the pollutants are dispersed in the atmosphere, undergo certain changes, and, most importantly, begin to drift, sometimes in rather complex ways. The course of this drift and the manner in which it takes place are determined by the volume and chemical composition of the fallout material, and so a knowledge of these two determinants is of great practical importance. Such knowledge may even contribute in a fundamental way to the correct assessment of air pollution levels and serve as an aid in devising means to correct this situation. However, in contrast to emissions and pollutants, which as physical quantities are relatively easy to ascertain, the degree to which pollutants are dispersed in the atmosphere is very difficult to determine, especially so since the nature and concentrations of this airborne particulate matter do not permit its visual or photographic observation. True, it is possible to collect test samples from airplanes or helicopters, but

this technique cannot be used always and everywhere, since it is subject to numerous technical and pragmatic limitations.

More and more frequent attempts are now being made to resolve this problem by means of remote-sensing methods, that is, methods based on the remote measurement of pollutant-behavior phenomena that make it possible to "observe" conditions in a zone of air space with fixed limits. One of these methods involves probing the atmosphere with laser beams, and in this category the lidar, or photonic radar, method is considered to be especially interesting and promising.

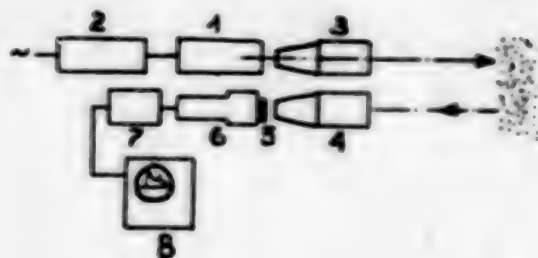
The principles involved in the operation of a lidar device are similar to those that govern the functioning of radar systems, the only difference being that instead of radio waves the lidar device uses a narrowly focused laser beam. The short-pulse laser beams are sent out into the atmosphere and wind up being dispersed by various atmospheric anomalies; a certain amount of this dispersed radiation is reflected back to and recorded by the instrument, thereby yielding data on the position of an atmospheric layer which is dispersing this light radiation and on its physical characteristics.

There are various models of lidar devices with varying applications. The simplest version is the lidar device that is sometimes referred to as a "dust lidar," since its use is based on the detection of phenomena caused by the dispersion of laser beams passing through a medium of atmospheric aerosols. A simplified schematic of such a lidar device is shown in diagram 1. The transmitter is equipped with a pulse laser. The beam, which is generated by the laser and focused by a collimation scope, makes a sweep across a given section of air space, and the dispersed portion of this beam is reflected back to an optical receiving system; next, a photomultiplier translates the optical signal into an electronic signal which, after having been amplified, is recorded on an oscilloscope or some other read-out device. The receiver system is tuned so that it will pick up radiation on the same (chromatic) wavelength as the wavelength of the radiation generated by the transmitter.

Another lidar model is the so-called Raman lidar, whose operation is based on the detection of phenomena caused by the dispersion of light radiation in a medium of gas molecules, i.e., the so-called Raman effect, which alter the wavelength of the dispersed radiation in relation to the point-of-emission radiation. This kind of lidar device makes it possible to run tests for the presence and atmospheric density of certain gases (such as NO and SO₂, among others).

Finally, there is the differential absorption lidar device which is used to register the absorption of light radiation scattered back through aerosols. By tuning the device's working wavelength to the band within which light is absorbed by the gaseous constituents of the atmosphere, being the pollutants, it is possible to detect the presence of these pollutants and to determine their levels of concentration.

Diagram 1. Schematic of a "Dust" Lidar Device



Key:

1. Pulse laser
2. High-voltage power feed for laser
3. Transmitter collimation scope
4. Optical receiver system (the "antenna")
5. Filter
6. Photomultiplier
7. Amplifier
8. Read-out oscilloscope

In Poland some pioneering work on the application of lidar systems to air-quality research has been accomplished at the Geophysics Institute of the Polish Academy of Sciences under the direction of Dr Sylwester Puchalski. During 1974-1975 the lidar method attracted the interest of a research team at the Institute of Meteorology and Water Resources Management in Krakow. This team got in touch with Dr Puchalski's research team and, with its cooperation, work got under way in 1976 on the development of a design for a lidar device which would be specially adapted to carry out certain selected lower-atmosphere research tasks. Thanks to the support which was given to the advancement of the lidar technique by professor Dr S. Jarzebski, director of the PAN [Polish Academy of Sciences] Institute for the Study of the Basic Principles of Environmental Engineering, this design project was included in the research program for the critical research and development problem no 10.2 entitled "The Physical Foundations of Environmental Management."

The Mayor of the City of Krakow took an interest in the problems associated with the construction of this instrument, thereby insuring that the research costs would be reimbursed, with a view to utilizing this device and this method of measurement to conduct air-quality surveys in the Krakow metropolitan area.

The task of building and testing a prototype lidar device was undertaken by a research team, headed by the author of this article, whose members are: Dr A. Bielak, Dr T. Z. Dworak, M. Czyczylo, W. Matula, J. M. Psuj, and J. Zygiel. This team carried out its work on this project at the Center for Upper Atmospheric Studies of the Institute for Meteorology and Water Resources Management (Krakow Branch).

During the period 1976-1977 work was completed on the drafting of designs for this device and on the fabrication of the more important subassemblies. In 1978 the device was assembled and all of its components were put into working order, and now work is getting under way on the testing and research phase of the project. In 1980 it is expected that the device will be adapted so that it can be mounted on a mobile flatbed truck platform.

The prototype model of this lidar device, designated by the acronym LIMZ-1 (Lidar Malego Zasiegu, versja 1 [Short-range Lidar, Model 1]), is shown in the photograph below. This is a "dust" lidar which operates in accordance with the principles described above. It consists of a transmission unit (a ruby laser with a collimation scope) and a reception unit (a Zeiss reception scope and a photomultiplier equipped with an amplifier) tandem-mounted on a mobile tripod cradle.

The tripod stand, which is equipped with a sight, makes it possible to aim the lidar device in any direction with a wide range of angles of elevation and azimuths. Situated alongside the tripod stand, the photograph also shows the following auxiliary units: a high-voltage power feed for the laser, a cooling system for the laser lamphead, a power feed unit for the photomultiplier and an oscilloscope read-out system.



Photo 1. Prototype of a LIMZ-1 Lidar Mounted on a Swivel Tripod Stand

The cradle and transmission-reception unit can also be set up on a horizontal platform equipped with an attachment on which a reflector is mounted for making consecutive overhead readings. Moreover, several auxiliary instruments were made which make it easier to align the system, to check laser parameters, and so on. Altogether, the model of this device equipped with a swivel tripod stand weighs 350 kilograms.

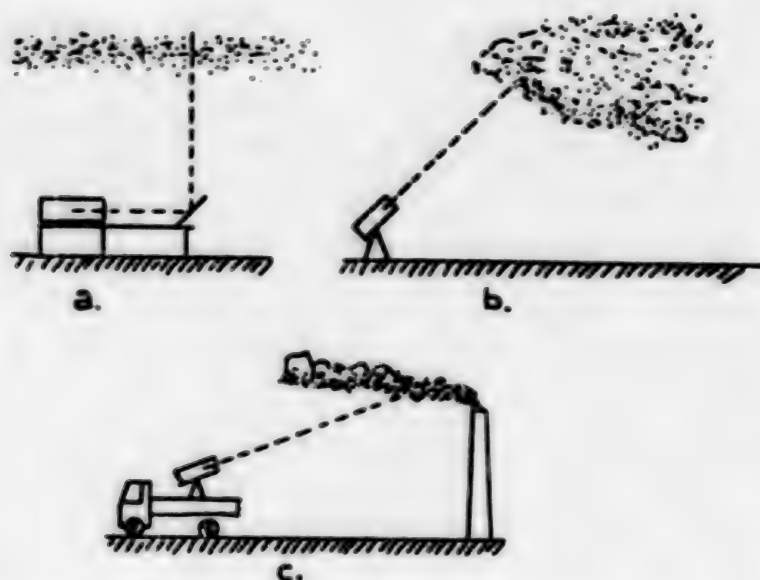
During the testing process it is expected that at least two interchangeable laser lampheads will be used. The lamphead that is installed on this device at the present time yields a maximum pulse power of 0.2 joules with a pulse interval of 50 nanoseconds. The range of observation will depend upon prevailing weather conditions. Under favorable weather conditions this range may extend to several kilometers.

The principal mission of this instrument is to detect and determine the extent of dust layers, trails and clouds in the atmosphere and also to take advantage of these objects as indicators of meteorological phenomena, including, inter alia, inversion layers. It is anticipated that tests will be made at a later date to determine the feasibility of using this device to ascertain the concentration levels of particulate matter in the atmosphere. Plans are also being made to test the feasibility of using this device to determine relative variations in the concentration of dust in the chimney-smoke columns, using the correlation method, based on the tagging of lidar readings by means of simultaneous measurements made directly within chimney stacks.

A practical evaluation of the range of this instrument's applications and also of its advantage and disadvantages will be possible after the completion of the testing and shakedown-operation phase. But it would seem that, in the absence of other, better methods, the lidar system will prove to be useful as a means of determining the drift patterns of atmospheric dust and--in conjunction with other surface measurement methods--will be helpful in determining the functional relationship between the volume of airborne particulate pollutants and location of emission sources and between weather conditions and the concentrations of airborne particulate pollutants in different urban areas.

It is very important that work should get under way on the trial-run operation of lidar systems and on their utilization for the protection of urban airsheds, since only in practice will it be possible to ascertain and improve upon the measurement capabilities of this instrument and also to gain an understanding of its functional characteristics and to refine the instrument's performance in this respect. As is the case with any highly complex instrument, a lidar device needs to undergo certain control and maintenance operations at regular intervals (e.g., the alignment of the optical system, the cleaning of laser lampheads, control measurements, and so on). The development of instrumentation and techniques designed to facilitate the performance of these functions also has to be tested and evaluated under working conditions.

Diagram 2. A Schematic Outline of Certain Possible Applications of a "Dust" Lidar Device



Key:

- a. Overhead readings--used to determine the position of aerosol layers in the atmosphere;
- b. Directional readings--used to determine the extent of airborne zones of particulate matter;
- c. Directional readings made from a mobile platform--used to determine the geometric characteristics of chimney smoke columns and possibly the relative concentrations of aerosols within these columns.

An analysis of the characteristics of remote-sensing techniques--of which the lidar-type technique is one of many--shows that any remote-sensing system demonstrates its advantages most fully when and if it is used as part of a complex of mutually complementary measurement systems. And so in the case of the lidar system as well it is necessary to call attention to the fact that its utilization and application to specific missions should include the making of allowances for a structurally and functionally appropriate total system designed to monitor air quality along trajectories spanning the entire distance between emission sources and the impact zones of these emissions.

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CSO: 5000

BRIEFS

SANITATION CAMPAIGN IN SANA'A'--Sana'a', 19 Jul 79--Today the office of the Ministry of Health for the governorate of Sana'a' announced a new program of visitations and instructions to be given to all the hotels, restaurants, cafes, groceries, and bakeries in order to implement a program of sanitation and sanitary procedures in all food serving businesses. The owners and workers in these sites will be instructed and advised on how to maintain sanitary standards in order to prevent disease and contamination. There will be inspections in the future. [Excerpts][Sana'a' AL-THAWRAH in Arabic 19 Jul 79 p 6]

CSO: 5000

SOUTH AFRICA

GOVERNMENT FORCED TO HALT CONSTRUCTION OF ESCOM PLANT

Air Pollution

Johannesburg THE STAR in English 27 Jul 79 p 1

[Article by Jaap Boekkooi]

[Text] A large build-up of air pollution over the Eastern Transvaal highveld as a result of smog from the Sasol 2 and Sasol 3 plants has forced the Government to veto the building of another giant powerstation in the area.

From some time Escom had been planning to build the new mammoth station, to be named Ilanga--Zulu for "sun"--near the new Kriel and Matla power stations, not far north of the two Sasol plants and Secunda.

The Government's veto was based on smog readings taken in the area between Ogies, Bethal and Secunda by environmental scientists.

Standerton

There is some chance that Ilanga may be built near Standerton, away from the Sasol-Kriel-Matla pollution area because of three considerations.

The new giant Kromdraai Dam near the town will have surplus water; Anglo American Corporation which owns extensive coalfields nearby is keen to have more long-term contracts with Escom; and there is a new supply of better-qualified coloured labour in Standerton, designated a new coloured growth area.

Escom's Eastern Transvaal powerstations, main contributors to the national power grid, are fitting smog-reducing precipitators where possible and catching up to 98 percent of ash before it leaves chimneys but the Government is worried about other, invisible forms of pollution.

Cleaning processes would cost millions.

The Government veto will also affect plans for still another jumbo power-station planned by Escom for the Eastern Transvaal to be known as Gutuka, a Tswana/Sotho term for "to heat."

Move Hailed

Johannesburg THE STAR in English 2 Aug 79 p 26

[Editorial: "Chancing an Armpit"]

[Text] It is good news that the Department of Health has scotched a move by Escom to erect another giant power station on the Eastern Transvaal highveld. And it says nothing for Escom that it actually hoped to get the green light. It must know as well as anybody that this region is dangerously polluted by its existing clutch of power stations, which mostly scrub out visible pollution but do nothing to trap sulphur gases. Escom's pollution plus that expected from Sasol 2 and 3 are turning the area into the armpit of South Africa.

CSO: 5000

CYANIDE SCARE CLOSES HARBOUR

Johannesburg THE CITIZEN in English 9 Aug 79 p 1

[Article by Tim Clarke]

[Text]

DURBAN. — Part of Durban harbour was cordoned off yesterday as a precautionary measure as it was thought that some deadly cyanide had leaked from two damaged drums of a consignment being off-loaded from the Greek cargo vessel, Hellenic Torch.

A pin-head of cyanide can kill an adult. It was Durban's second scare in a month.

After a thorough investigation which lasted for several hours, Colonel F de Beer, Officer Commanding the Railway Police, Natal system, said yesterday he was satisfied none of the poison had leaked.

The full weight of the consignment of sodium cyanide had been weighed repeatedly and the full weight was present in the 4 000 drum consignment which is bound for the Transvaal, he said.

The scare started yesterday morning when one of the workers off-loading the consignment noticed the two damaged drums.

He immediately contacted the skipper of the Hellenic Torch and the harbour authorities.

The police sealed the area off while the drums were examined.

On July 12, news broke of the loss of 56 kg of the poison being unloaded from another ship. Despite an intensive search by the SAP, Railway Police, harbour authorities and State Health, no definite conclusion on its whereabouts has been reached.

CSO: 5000

FARMERS OPPOSE CLOUD-SEEDING PROJECT

Johannesburg SUNDAY TIMES in English 29 Jul 79 p 14

[Article by Geoffrey Allen: "'Poison Rain' a Threat, Say Farmers"]

[Text]

ANGRY Lowveld farmers are fighting a last-ditch battle against a hail-prevention project because they believe it will turn them into zombies.

The dispute is expected to erupt this week at a meeting of the farmers co-operative which sponsors the weather programme.

In the cloud-seeding project silver flares are fired into the clouds from jet planes thus suppressing hail which in the past has caused damage of millions of rand to the tobacco crop.

Now, says the co-operative, there is an increase in rainfall and Mr B L Botes, leader of the militant farmers, claims that his action committee has medical evidence that an excess of silver iodide in the atmosphere can have a retarding effect on the minds of humans.

"It effects the thyroid gland and slows down the thought processes," he said.

Mr Botes said that this shock new evidence would be made public at the meet-

ing when a retired medical doctor, who now farmed in the Lowveld, would tell of his findings of the effects of silver iodide.

The farmers, who want the weather-modification and hail-suppression activities in the area stopped, are preparing to tackle the directors of the Lowveld Co-operative, which finances the R1-million a year programme, at their annual meeting this week.

The farmers say that the directors went back on their word when they decided to drop an item from the agenda which would have led to full and open discussion on the programme.

The Action Committee has taken a half-page advertisement in the Nelspruit newspaper displaying a letter which it received from the directors on July 13.

In the letter the board undertook to include on the agenda an item for debate on the "continuation or discontinuation of the weather modification programme".

The advert claims that the board has now gone back on its word.

The Action Committee has issued a written statement claiming that weather modification has several adverse effects on the Lowveld.

The general manager of the Co-operative, Mr L M Opperman, agreed that the directors had given Mr Botes a written undertaking that the item would be included on the agenda and that a decision would be taken at the meeting on whether or not to continue the programme.

But, he said, they later decided that the meeting would not be an appropriate platform for such a far-reaching decision on a major undertaking.

Mr Opperman said that there would still be an opportunity for discussion of the controversial programme once the chairman had referred to it in his full report.

He said: "Mr Botes wants to force us to take a vote on this expensive programme just like that."

"We cannot be forced. There are set rules of procedure in these cases."

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BRIEFS

NEW OIL SPILL-REMOVING SHIP—The construction of a special ship for removing oil slicks on the open sea has been completed in Odessa. With a displacement of about 10,000 dwt, the ship, when equipped with special devices, can suck up 400 cubic meters of oil. [Text] [Bonn DIE WIRTSCHAFT DES OSTENS in German 29 Jun 79 p 5]

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PROPOSED LAW FOR CONTROL OF CHEMICALS DISCUSSED

Bonn DEUTSCHE ZEITUNG in German 6 Jul 79 p 20

[Article by Michael Globig: "On the Trail of Toxic Substances"]

[Text] A few days ago, the Federal Cabinet finally passed the long-contested bill concerning control of chemicals in the environment. The bill stipulates that beginning in 1982 the producers or importers of new chemicals must have these products registered; moreover, the chemicals must first be subjected to a test designed to determine whether they are dangerous to people or the environment. The state agencies are entitled either to allow only limited production of particularly critical substances or to prohibit production altogether. The bill was preceded by protracted interjurisdictional negotiations involving the four Federal ministries (interior, health, agriculture, and economics) which last fall had been entrusted with drawing up the text of the law.

These efforts resulted in a law for control of chemicals in the environment, which--although it does not take into consideration all of the demands raised by environmentalists and medical experts--is regarded by industry as an acceptable compromise. In regard to particulars, the bill stipulates that new substances put on the market, which in the Federal Republic amount to 100 to 250 per year, be registered with the Dortmund Federal Office for Accident Prevention and Accident Research 30 days before their introduction. Along with registration, it is necessary to submit test results indicating whether the substance is toxic, mutagenic or carcinogenic and how it acts on the environment. If the documents prove incomplete or faulty, the agency can grant an extension of 30 days, within which period supplementary data must be submitted.

The test requirements are graduated in accordance with the quantity marketed. Substances, production or imports of which amount to less than 1 ton per year, need not be registered. This clause was included primarily at the request of the chemical industry which wanted to have those products exempted from the test that are intended exclusively for research. However, the law also mentions the exceptions from this rule: If there is any indication

that the substance is dangerous to man and the environment, it must be tested regardless of the intended use or the quantity produced.

The next two--more stringent--test stages are applicable to production volumes exceeding 100 and 1,000 tons per year, respectively. If these tests reveal suspicious facts concerning the chemical in question and if the testing agency raises objections against the product, the agency can order more extensive tests or issue injunctions ranging from restricted acceptance to outright prohibition.

According to the bill, the analyses, the results of which must be submitted at the time of registration, are more comprehensive than had originally been intended in that they include not only tests for acute toxicity (short-term toxic effect), but also tests concerning the "subacute" (medium-term) risk of intoxication which can only be determined within a period of 28 days. However, the catalog does not include tests for any long-term (chronic) effects of the substances. Other tests are designed to determine the degree of environmental compatibility and the potential mutagenicity and carcinogenicity of chemical compounds.

The approximately 45,000 substances (contained in over 1 million preparations) which are already on the market and on the toxicity of which nothing or little is known can only through a special statutory order be subjected to the provisions of the new law, if they are suspected of being toxic or dangerous. According to estimates, such a decree would be applicable to approximately 3,000 "old substances" regarded as potentially toxic. Of these chemicals, the Federal Republic plans to test approximately six per year. Additional test results are to be obtained from abroad.

For the chemical industry, the new test requirements entail additional expenditures of maximally DM 40 million per year--an amount which in view of an annual turnover volume of DM 70 billion is considered reasonable.

The Association of Chemical Producers basically welcomes the bill; specifically, it approves those clauses that are in agreement with the EEC's recent guidelines concerning the use and handling of dangerous materials. However, the association fears there may be restraints on free competition, if the German registration office requires additional tests that go beyond the EEC model agreed upon. Moreover, the industry complains about being required to submit a great many data and facts that could easily reveal trade and business secrets. For this reason, special protection against unauthorized use and transmission of data is necessary, claims the association.

Aside from the chemical industry, the state, too, will be saddled with additional costs by the new law. The competent authorities (the Federal Office for Public Health, the Federal Office for the Protection of the Environment, and the Federal Office for Accident Prevention and Accident Research) have already announced their need for up to 500 additional full-time personnel;

the resulting increase in salaries and wages would amount to maximally DM 40 million per year. This particular point is likely to trigger heated debates, when the bill is introduced for discussion in the Bundestag [Lower House] and the Bundesrat [Upper House]. But our health should be worth that much money.

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